J.R. SIMPLOT GRANDVIEW FEEDLOT

NUTRIENT MANAGEMENT PLAN

Appendix 5

Book 1 of 2

Simplot Feedlot - Grandview Nutrient Management Plan

Agriculture . . .

Launching into the Future



Nutrient Management Plan Prepared For:

Simplot Livestock Company (208) 834-2231 Simplot Feedlot - Grandview

Certified Planner:

Michael Mitchell Professional Engineer, EAC Engineering, Inc. (559) 381-0607

Producer Signature: _	Certificated Planner Signature:	_
	Date Completed: 2-04-08	

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27.17D6)

Producer Summary

Farm Summary

Grand View Feedlot is an existing feedlot located north of Grand View at 1301 Highway 67. The feedlot is owned by Simplot Livestock Company and operated by Dick Crockett. Grand View Feedlot is an open lot facility with a capacity of approximately 150,000 head of cattle. This plan has been developed based on an annual headcount of 65,000, which has been the recent historic average and is likely to remain the operating level for the near future. The number of cattle on the feedlot fluctuates significantly through the season. The weights of the cattle in the feedlot vary, however, a review of the records indicate approximately 55,000 – 900 lbs animals and approximately 10,000 – 700 lbs animals.

The feedlot is situated primarily on the north side of Highway 67, with several large pens located on the south side, east of the office complex. The wastewater for the runoff containment system is utilized on-site and land applied through the center 840' of the west pivot on Farm 1. Very little manure solids accumulate in the runoff retention pond system, so little water remains for land application to these fields.

Due to the limitations and constraints of the One Plan Nutrient Management program, all farm land associated with this feedlot has been included in individual NMP's receiving biosolids from the feedlot. Therefore, all manure is shown as exported from the feedlot facility, however, much of that export is to land owned by Grandview Farms.

Farm Resource Concerns

Grand View Feedlot is located in the Watershed Basin of the Middle Snake-Succor (17050103). The facility is found at X = 2330562.65870354, Y = 1317203.64535589. The primary resource concern for the Grand View Feedlot is groundwater quality. Storm water runoff from the feedlot will be diverted to the wastewater containment ponds on the southwest side of the facility. Wastewater from this containment pond is land applied to the field to the southwest of the pond or is utilized on-site as dust control during the summer. All manure from the livestock is deposited in the open lot corrals, where it is stored for composting/land application on farm land associated with the facility and third party receivers.

Storage and Handling Requirements

- This facility has limited application of wastewater. The wastewater that is applied is done
 through a center pivot irrigation system on the southwest comer of the facility. This
 application is made through an independent application line, which prevents application
 from being made near the canal on the southwest edge of these fields.
- The hydraulic balance date for this facility is approximately April 1, however, soil moisture testing prior to land application may indicate earlier wastewater applications are allowed, while still being protective of groundwater.
- Facility runoff containment has been designed / analyzed by Brockway Engineering. The
 report is attached as Appendix (A) excluding those portions that deal with nutrient
 budgeting or plant uptake.
- The open lot pens utilized at this facility are designed with bedding mounds for proper corral maintenance. These mounds are bedded during the "wet months" to provide a

comfortable housing area for the cattle. It is assumed that approximately 25% of the manure deposited within the pens each year is utilized in the construction and maintenance of these bedding mounds. The remainder of the manure is exported from the pens several times per year for direct land application or composting.

Additional Information

- 1000 total number of pasture cattle
- 63,900 cubic feet of manure produced
- 11,875 lbs (4762 lbs crop use) of N
- 3,733 lbs of P (1.37 lbs per acre)
- 4760 lbs of K produced

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

- 1. Chemical fertilizer application rates, if any.
- 2. Manure/Compost application rates.
- 3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
- 4. Fields to which the nutrients are applied.
- 5. Spring soil test for nitrogen (required annually) on fields receiving biosolids.
- 6. Manure export records, to Grandview Farms and 3rd party recipients shall be generated and maintained for review by ISDA staff.

Due to the scale of this facility and the hauling distances required for the land application of compost/manure solids, biosolid testing must be implemented to insure efficient application of biosolids to the receiving cropland. Biosolid testing should be completed weekly during manure hauling(if hauled directly to fields for application), utilizing consolidated samples from several pens and multiple locations within the manure stack. Biosolid testing of composted or stockpiled manure should be completed just prior to application to insure accurate nutrient availability predictions. The following table may be utilized to determine the application rates required on individual fields.

Manure/Compost field application requirement (tons)											
Acres × crop nutrient requirement ÷ manure p205 value* = Tons required											
Example											
Com	250	X	65** = 18750	+ 16.85* = 1112.76 tons							

*based on manure test values for P205 – Actual value is variable, based on most current testing information available.

Initial plan preparation was based on ASABE D384.2 – Manure Production and Characteristics. These values should be utilized for initial planning only. Actual land application and manure export must be based on specific manure tests from the general area of the manure being hauled.

^{**}pounds of p205 required per acre

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate in excess of the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand, whenever possible.
- Apply fertilizer to cool season crops in the spring rather than the previous fall. This will
 prevent fertilizer leaching through the soil profile and provide the crop with the
 necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Simplot Feedlot - Grandview ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

- 1) assure proper containment of animal manure and process waste water
- 2) assess resource concerns which exist on the property
- 3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.
- 4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO₅) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue). Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1): Simplot Livestock Company

Address: 1301 Highway 67, Grand View, ID 83624 Phone: (208) 834-2231 – Dick Crockett - Manager

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation

Elmore

District: County:

Elmore

Watershed Basin:

Middle Snake-succor (USGS Hydrologic Unit Code #

17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Simplot Feedlot - Grandview is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES		CHAN STAB	DO	FLOW	HAB ALT	MET HG	MET	NH3	NUTR	0_G	ORG	PEST	PH	SAL	SED	ТDG	TEMP	UNKN	•
Birch Creek	Headwaters to Snake River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ı	0	0	0	厂
	Headwaters to Catherine Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	٥	0	0	Γ
Castle Creek	T5SR1ES28 to Snake River	0	0	0	1	0	0	0	0	0	0	0	0	0	0	:1:	0	1	0	Γ
Corder Creek	Headwaters to Snake River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	Г
Hardtrigger Cr	Headwaters to Snake River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	Г
Jump Creek	Headwaters to Snake River	٥	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	٥	0	
McBride Creek	Headwaters to Oregon Line	0	0	0	1	0	0	٥	0	0	0	0	0	0	0	1	0	1	0	Γ
Pickett Creek	Headwaters to T5SR1W32	0	0	0	١	0	0	0	0	0	0	0	0	0	0	i	0	1	0	Г
Pickett Creek	T5SR1WS32 to Catherine Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	_
Poison Creek	Headwaters to Shoofly Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ı	0	0	0	\Box
Rabbit Creek	Headwaters to Snake River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
Reynolds Creek	Diversion to Snake River	0	0	٥	0	0	0	٥	0	0	0	0	0	0	0	1	0	0	0	Г
Sinker Creek	Diamond Creek to Snake River	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	ι	0	

Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.	0	Γ
Snake River	Castle Creek to Swan Falis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
Snake River	Swan Falls to Boise River	1	0	ı:	1	0	0	0	0	1	0	0	0	1	0	1	0	0	0	
South Fork Cas	Headwaters to Castle Creek	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Г
Squaw Creek	Unnamed trib 3.9 km upstream to Snake River	0	0	0	0	0	0	0	0	٥	0	0	0	0	0	1	0	0	0	Г
Succor Creek	Headwaters to Oregon Line	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	
Succor Creek	Oregon line to Snake River	0	0	0	0	٥	0	0	0	0	0	0	0	0	0	ı	0	0	0	F

Simplot Feedlot - Grandview is <u>not</u> located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

<u>Priority 1</u> is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

<u>Priority 2</u> is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Simplot Feedlot - Grandview is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

No Resource Concerns -

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)			
Wastewater Application	Cobbles	12			
	Water Table	42			

Well Testing Results (See back of page):

	Date	SS	EC	PH		es	Nitrite s			te	Bicarbon ate
NoDa	NoDa	NoData	NoDa	NoDa	NoDa	NoDat	NoDa	NoDa	NoDa	NoData	NoData
ta	ta	11024	ta	ta	ta	a	ta	ta	ta		

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	hwachaid	P Threshehold Soil Test Depth
Wastewater Application	Groundwater < 5'	20	18 - 24"

Farm Location

 $\frac{\text{Idaho Transverse Mercator}}{\text{Coordinates of the farm center (meters): } X = 2330562.65870354, Y = 1317203.64535589$ Map Scale: 1:38

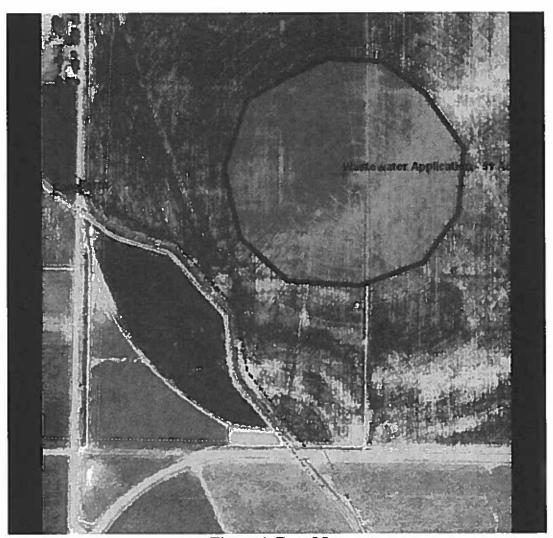
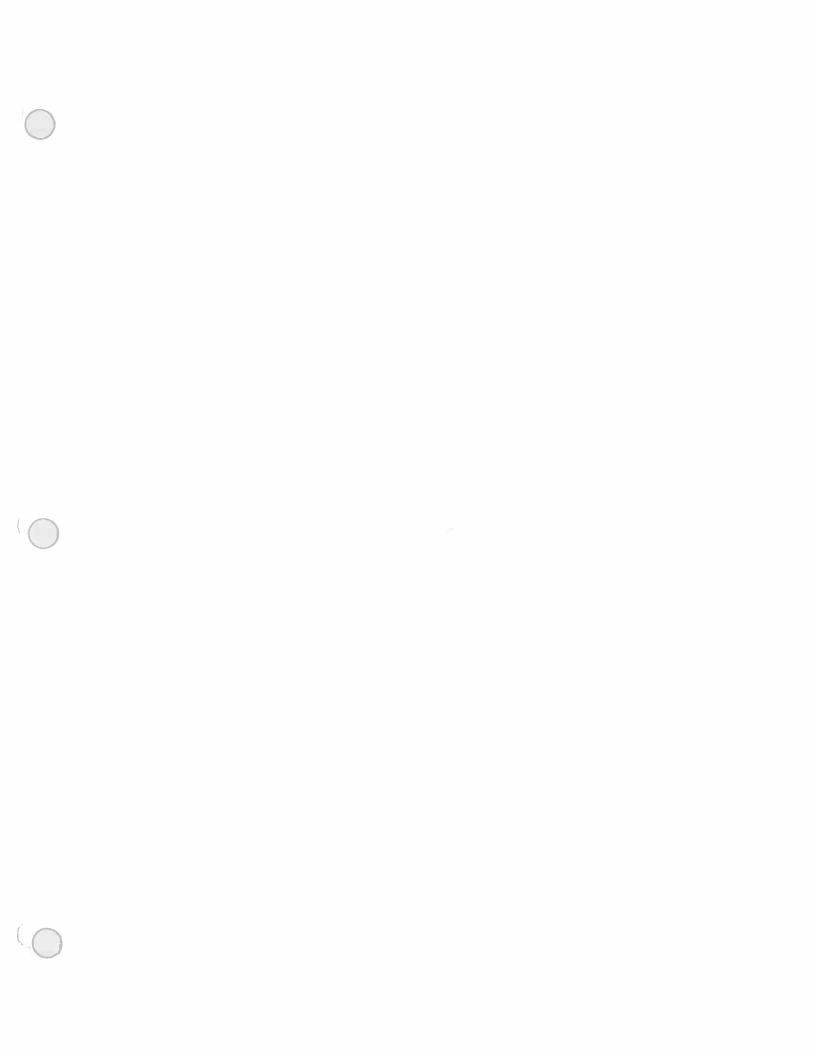


Figure 1. Base Map

Farm Location

 $\frac{\text{Idaho Transverse Mercator}}{\text{Coordinates of the farm center (meters): } X = 2330562.65870354, Y = 1317203.64535589$

Figure 2. See Map on Following Page



NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: Wastewater Application

Name	Man App		Miner	alization	τ	otal
Corn-Field Grain, Irrigated South ID(2004)	Y	Z	N	0	Z	0
Con-1 late creat, angues count in (2007)		P			₽	0
		ĸ	鑩		K	0
Corn-Field Grain, Irrigated South ID(2005)	Y	N	N	-35	И	-35
lance a recommend to the property of a party	Ė	P		1802	P	0
		ĸ	3	3	ĸ	0

Minimum Acres Required for Manure Application

Manure Group	Acres
Solid Stack(s)	20,407

The acreage in the table is based on an average crop uptake of 100 lbs P₂O₅ per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Dairy Bureau (208) 332-8550.

Hydraulic Balance

Field	Date
Wastewater Application	April 1

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test

Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required, however, they are recommended. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Wastewater Application Crop: Corn-Field Grain, Irrigated South ID Yield: 210

	N	P205	K20
Crop Nutrient Requirement	300	75	56
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	0		
from Irrigation Water	0		0
Nutrient Balance from above	336	75.4	56.4
N/A	N/A	N/A	N/A
Estimated Remaining Nutrients Required	336	75	56
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	336	75	56

Rate is either deficit or is approaching an amount that may potentially contribute to an environmental risk.

Acceptable: Sustaninable agronomic rate.

ANALYSIS OF ANIMAL SYSTEM

WASTE STORAGE AND HANDLING

Livestock Unit Characteristic

Description	Animal	Number	Weight	Days Collected	Housing	Bedding Type	Bedding (tons)
Liniching	Beef - High forage diet	55,000	900	365	Open Lot	Compost	0
Background	Beef - High forage diet	10,000	700	365	Open Lot	Compost	0

Manure/Biosolid Groups

Manure Group	_	Application Method	Days to Incorporation	Nitrogen Retention(%)	Annual Volume (ft3)		
Stack(s)	Stored in	Broadcast, Incorporated less than 3 inches	4-7 days	80	36,057,692	47,450	

^{*} in Nitrogen Retention % Column means "Overridden Nitrogen Values"

Manure Group		Background	Finishing
Solid Stack(s)	% To	100	100
	Group		100

Annual Production of Nutrients

The nutrient values were calculated based on ASABE D384 and nitrogen loss estimates as described in the NRCS Agricultural Waste Management Field Handbook guidelines (1996). The calculations are estimates, and manure testing is recommended for more accuracy, as manure nutrient content varies widely among operations.

		Nutrient Distribution on Facility						
	Pounds N	Pounds P ₂ 0 ₅	Pounds K ₂ 0	% of Total				
Total Nutrients Produced	3494369	2041197	4599745					
Solid Stack(s)	3494369	2041197	4599745	100				
Truck Wash	1443	843	4066	100				

Comments on Bionutrients

Containment of Corral Runoff

It is important that all contaminated runoff from corrals be contained and/or diverted to the a storage system. As stated in the Idaho State Department of Agriculture (ISDA) regulations, a discharge is allowed only under large precipitation events (>25yr, 24hr storm event). Wastewater storage structures must be properly designed, operated, and maintained to contain all contaminated runoff from a 25-year, 24-hour rainfall event for the site location and maintained to contain all runoff from accumulation of winter precipitation from a one in five-year winter. Animals confined in the CAFO may not have direct contact with canals, streams, lakes, or other surface waters.

A complete analysis of the wastewater storage system at this facility has been provided with this plan in the form of a report prepared by Brockway Engineering.

BIO-NUTRIENT EXPORT INFO

SECURITION OF STREET AND ADDRESS OF STREET	Tons Required
Farm 1	3845.83
Farm 2A	2237.00
Farm 2B	8291.00
Farm 4	5622.40
Angel	2350.00
Aslett Place	3550.00
Bryant	2117.00
Collett Farm	1385.00
Cox Farm	1475.00
Dixie	1214.00
Dobaron	2219.94
Gilbert	826.00
Jayo	492.40
Morrison	1800.30
McCune	600.00
Nicholson	6187.30
Palmer - Lopez	1276.52
Sandhill	5400.00
Shaw	309.00
Triangle	7866.00
Smith Pastures	5233.00
Boltz Pasture	1584.00
Export to Grandview Farms	65881.69

Additional compost/manure is exported to local farms in the area, however, this export varies on an annual basis and cannot be predicted here. Records will be retained by the owner of all off-site manure exportation.

ANALYSIS OF CROPPING SYSTEM

Farming Operation

Total Acres: 51

Crop Production History

THIS IS NOT A FERTILIZER RECOMMENDATION

Crop Rotation Name: Wastewater

Crop	Yield	Yield Units	N Requirement	P ₂ 0 ₅ uptake	K ₂ 0 Requirement
Com-Field Grain, Irrigated South ID	210	bu/acre	300	75.4	240
Average				75	

^{*} Nitrogen and Potassium Requirements assume zero credits.

Crop P2O5 Requirement = 51*75=3825 lbs/yr

Truck Wash Wastewater contains approximately 843 lbs of P2O5 – about 22% of the crop requirement. There would likely be a portion of manure solids from the facility runoff ending up in the containment pond, however, this fraction is too difficult to estimate. Therefore, wastewater application will be monitored through soil testing of the 51 acre pivot field area.

Mapped Resource Concern(s)

Field Name	Acres	Resource Concern(s)
NoData	NoData	NoData

ANALYSIS OF IRRIGATION PRACTICES

Irrigation Management

Proper irrigation management depends on factors such as the following.

Irrigation Efficiency: The efficiency with which the irrigation wets the entire crop root zone. This takes losses that occur from evaporation, runoff and deep percolation.

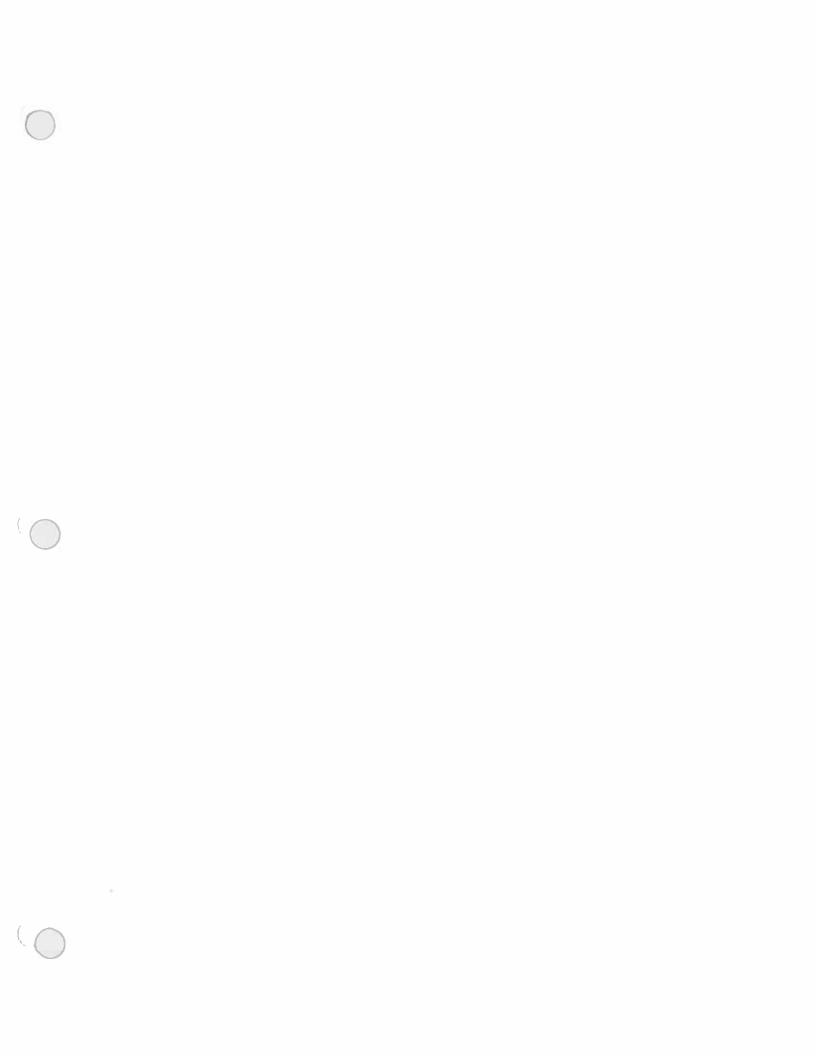
Crop Evapotranspiration Rate (ET): The combined rate at which water from the soil profile is evaporated into the atmosphere and transpired from the crop. The rate is expressed in units of inches/day.

Management Allowable Depletion (MAD): The percentage of water, which can be depleted from the soil before the crop, experiences water deficiency stress.

Available Water Holding Capacity in the Soil (AWH): The amount of water the pores in the soil profile can hold against gravity. The AWH is expressed as inches of water per inch of soil.

Crop Rooting Depth: The depth in the soil profile to which the crop roots can penetrate.

				P	ivot Irrigation Sumi	nary			
			Fi	eld 1	Name: Wastewater A	pplica	tion		
Evaporation/Drift Losses:					7.5	%			
Date of	f Initial Irriga	ation:			3/1/2005				
Curren	t Crop				Corn-Field Grain, Irrigated South ID				
System Flow Rate:				500.0 gpm					
Length of Pivot:					840	ft			
Estima	ited Runoff:				.0	in			
Month	Days Be	etween igation	One Pivot Cycle (hrs)		Water Applied (in)		Net Irrigation Requirement (in)	Deep Perc.	_
Mar		31.0	24.0		.5		.0	.0	.0
Apr		30.0	24.0		.5		.0	.0	.0
May	14.0	2	4.0	.5		1.1		.3	.0
Jun		7.0	24.0		.5		3.3	.0	.0
Jul		2.0	24.0		.5		7.7	.0	.0
Aug		2.0	24.0		.5		6.3	.0	1.5
Sep		5.0	24.0		.5		2.5	.0	1.6
Oct		30.0	24.0		.5		.0	.0	.0



Appendix A: ANALYSIS OF SOIL CHARACTERISTICS

Soil Survey (USDA NRCS) information was used to describe the soil variations across each field. This is not absolute and may vary for each specific situation. The soil map has broad areas that have distinctive pattern of soils, relief, and drainage. Each map unit on the soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. Because the minor soils are not described in the following summary, the combined acreage for all major soils will be less than the acreage for each field.

Table 1. Soil type across each field

Field Name		Percentage	Approximate Acreage	Surface Texture		
Wastewater Application	ORNEA	80	26.73	GR-L		
	LETHA	80	4.87	FSL		
	GRANDVIEW	80	9.23	L		

Note: 1- See Appendix A.

Table 2 contains important soil characteristics for each of the fields identified in this plan. Each soil characteristic listed is representative for the entire field based on a weighted average. (Caution: USDA NRCS Soil Survey information was used to estimate the values reported in Table 2. These are not absolute values and may vary for each specific situation. They are estimated values representative for each field.) The following includes a brief description of each of those factors:

Dominant Surface Texture -- The predominant texture of the surface layer. Soil texture is the relative proportion, by weight, of the particle separate classes (sand, silt, and clay) finer than 2 mm in equivalent diameter. Soil texture influences engineering works and plant growth and is used as an indicator of how soils formed. (See Appendix A)

Available Water Capacity (AWC) -- The volume of water that should be available to plants if the soil, inclusive of fragments, were at field capacity. It is commonly defined as the difference between the amount of soil moisture at field capacity and the amount at permanent wilting point. Typical Available Water Capacities are 0.6 inches/foot for a Sand and 2.0 inches/foot for a Silt Loam. Available Water Capacity is an important soil property in developing water budgets, predicting droughtiness, designing and operating irrigation systems, designing drainage systems, protecting water resources, and predicting yields.

Surface Soil Erodibility Factor (K) -- A factor which quantifies the susceptibility of soil detachment by water. Factors vary from a low of 0.02 to a high of 0.64.

Soil Loss Tolerance (T) -- The maximum amount of erosion at which the quality of a soil as a medium for plant growth can be maintained.

Slope -- The difference in elevation between two points expressed as a percentage of the distance between those points.

Permeability -- The quality of the soil that enables water or air to move through it.

Permeability Class -- Permeability expressed by classes ranging from very rapid to impermeable. (See Appendix A)

Runoff Class - An index of the likelihood for runoff to occur based on inherent soil and slope characteristic. Runoff classes range from Negligible to Very High. (See Appendix A)

Surface pH -- A numerical expression of the relative acidity or alkalinity of the surface soil layer.

Surface pH Classification -- A general descriptive term for soil pH, acid or alkaline.

Table 3 contains additional important soil characteristics for each of the fields identified in this plan. Each soil characteristic listed represents a potential limiting condition within the soil profile (< 5 feet) across the field. (Caution: USDA NRCS Soil Survey information was used to estimate the values reported in Table 2. These are not absolute values and may vary for each specific situation. They are estimated values representative for each field.) The following includes a brief description of each of those factors:

Soil Layer with > 50 % Gravel, Cobble or Stone -- A layer comprised of more than 50 % gravel, cobbles or stones.

Pan - A compact, dense layer in the soil that impedes the movement of water and the growth of roots. Examples include, hardpan, claypan, plowpan, and Fragipan. (See Appendix A)

Rock -- A layer of rock in the soil that impedes the movement of water and the growth of roots.

Seasonal High Water Table -- A seasonal water table that exist near the surface.

Drainage Class - Drainage class identifies the natural drainage condition of the soil. It refers to the frequency and duration of wet periods. Alteration of the water regime by humans, either through drainage or irrigation, is not a consideration unless the alterations have significantly changed the morphology of the soil. (See Appendix A)

Hydrologic Group -- A group of soils having similar runoff potential under similar storm and cover conditions.

Table 2. Soil characteristics representative for each field

	Representative For Entire Field (Weighted Average)												
Field Name	Dominant Surface Texture & (Acreage) ¹	Total Available Water Capacity to 5 feet (in)		Soil Loss Tolerance - T (tons/acre)	Calculated Sheet and Rill Erosion Rate ¹ (tons/acre)	Calculated Irrigation Induced Erosion Rate ¹ (tons/acre)		Permeability (in/hour)	Permeability Class ^{1,2}	Runoff Class ^{1,3}		Surface pH Classification	
Wastewater Application	Wastewater CP (4) 58) 56		0.27	3	-1	-1	3 86	0,41	Moderately Slow	L	8.36	Alkaline	

NOTES:

- I See Appendix A;
- 2 PERMEABILITY CLASSES: VR = Very Rapid, R = Rapid, MR = Moderately Rapid, M = Moderate, MS = Moderately Slow, S = Slow, VS = Very Slow, I = Impermeable;
- 3 RUNOFF CLASS: N = Negligible, LV = Very Low, L = Low, M = Medium, H = High, HV = Very High;

Table 3. Soil characteristics that represent a potential limiting condition within the soil profile (< 5 feet) across the entire field.

	Field Name	Depth to Limiting I	ayer <	5 feet - Soil Layer with Stone	h > 50 '	Depth to Limiting Layer < 5 feet - Pan ¹					
1		Dominant Conditi	on	Most Limiting Condition			Dominant Cond	ition	Most Limiting Condition		
ı		Layer Description ^{1,3}	Acres	Layer Description ^{1,2}	Acres	Minimum Depth (in)	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)
ı	Wastewater Application	GRV GRX CBV	41.58	GRV GRX CBV	41.58	12	No Pan Present	67.11	No Pan Present	67.L1	0

	Field Name	De	Limiting Layer < 5 fee	•	Depth to Limiting Layer < 5 feet - Seasonal High Water Table						
١		Dominant Condition	00	Most Limiting Condition			Dominant Condi	tion	Most Limiting Condition		
		Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)
Ī	Wastewater Application	No Rock Layer Present	67.11	No Rock Layer Present	67,11	N/A	Water Table Present	41.5B	Water Table Present	18.2	3.5

Field Name	Drainage Class ^{1,3}		Hydrologic Group ^t	
	Dominant Drainage Class	Acres	Dominant Hydrologic Group	Acres
Wastewater Application	Well drained	41.58	В	41.58

NOTES:

- 1 See Appendix A;
- 2 GRAVEL, COBBLE, or STONE: GRV = Very Gravelly, GRX = Extremely Gravelly, CBV = Very Cobbly, CBX = Extremely Cobbly, STV = Very Stony, STX = Extremely Stony, WB = Weathered Bedrock, and UWB = Unweathered Bedrock;
- 3 DRAINAGE CLASS: E = Excessively drained, SE = Somewhat Excessively drained, W = Well drained, MW = Moderately Well drained, SP = Somewhat Poorly drained, P = Poorly drained, VP = Very Poorly drained;

ANALYSIS OF SOIL CHARACTERISTICS Legend

Soil Pan

Hardpan – A hardened or cemented layer soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Claypan – A slowly permeable soil horizon that contains much more clay than the horizon above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Plowpan – A compacted layer formed in the soil directly below the plow layer.

Fragipan – A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restrict roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture sudenly under pressure rather than deform slowly.

Soil Drainage Class

Excessively drained (E). Water is removed very rapidly. The occurrence of internal free water commonly is very rare or very deep. The soils are commonly coarse-textured and have very high hydraulic conductivity or are very shallow. They are not suited to crop production unless irrigated.

Somewhat excessively drained (SE). Water is removed from the soil rapidly. Internal free water occurrence commonly is very rare or very deep. The soils are commonly coarse-textured and have high saturated hydraulic conductivity or are very shallow. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained (W). Water is removed from the soil readily but not rapidly. Internal free water occurrence commonly is deep or very deep; annual duration is not specified. Water is available to plants throughout most of the growing season in humid regions. Wetness does not inhibit growth of roots for significant periods during most growing seasons.

Moderately well drained (MW). Water is removed from the soil somewhat slowly during some periods of the year. Internal free water occurrence commonly is moderately deep and transitory through permanent. The soils are wet for only a short time within the rooting depth during the growing season, but long enough that most mesophytic crops are affected. They commonly have a moderately low or lower saturated hydraulic conductivity in a layer within the upper 1 m, periodically receive high rainfall, or both.

Somewhat poorly drained (SP). Water is removed slowly so that the soil is wet at a shallow depth for significant periods during the growing season. The occurrence of internal free water commonly is shallow to moderately deep and transitory to permanent. Wetness markedly restricts the growth of mesophytic crops, unless artificial drainage is provided. The soils commonly have one or more of the following characteristics: low or very low saturated hydraulic conductivity, a high water table, additional water from seepage, or nearly continuous rainfall.

Poorly drained (P). Water is removed so slowly that the soil is wet at shallow depths periodically during the growing season or remains wet for long periods. The occurrence of internal free water is shallow or very shallow and common or persistent. Free water is commonly at or near the surface long enough during the growing season so that most mesophytic crops cannot be grown, unless the soil is artificially drained. The soil, however, is not continuously wet directly below plow-depth. Free water at shallow depth is

usually present. This water table is commonly the result of low or very low saturated hydraulic conductivity of nearly continuous rainfall, or of a combination of these.

Very poorly drained (VP). Water is removed from the soil so slowly that free water remains at or very near the ground surface during much of the growing season. The occurrence of internal free water is very shallow and persistent or permanent. Unless the soil is artificially drained, most mesophytic crops cannot be grown. The soils are commonly level or depressed and frequently ponded. If rainfall is high or nearly continuous, slope gradients may be greater.

Soil Hydrologic Group

Group A - Soils that have low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands and gravels. These soils have a high rate of water transmission (greater than 0.30 in/hr).

Group B - Soils that have moderate infiltration rates when thoroughly wetted. They consist chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission (greater than 0.15 - 0.30 in/hr).

Group C - Soils that have low infiltration rates when thoroughly wetted. They consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine texture. These soils have a low rate of water transmission (greater than 0.05 - 0.15 in/hr).

Group D - Soils that have high runoff potential. They have very low infiltration rates when thoroughly wetted. They consist chiefly of clay soils with high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over impervious material. These soils have a very low rate of water transmission (greater than 0.0 - 0.05 in/hr).

Soil Permeability Class

Very Rapid:

20.0 to 100.0 inches/hour

Rapid:

6.0 to 20.0 inches/hour

Moderately Rapid: 2.0 to 6.0 inches/hour

Moderate:

0.6 to 2.0 inches/hour

Moderately Slow: 0.2 to 0.6 inches/hour

Slow:

0.06 to 0.20 inches

Very Slow:

0.0015 to 0.06 inches/hour

Impermeable:

0.0000 to 0.0015 inches/hour

Soil Texture Modifiers, Texture Class and Terms Used in Lieu of Texture.

	3.6.11.00		01
	e Modifiers		e Class
ASHY	-	C	Clay
BY	Bouldery	CL	Clay loam
BYV	Very bouldery	COS	Coarse sand
BYX	Extremely bouldery	COSL	Coarse sandy loam
CB	Cobbly	FS	Fine sand
CBV	Very cobbly	FSL	Fine sandy loam
CBX		L	Loam
CN	Channery		Loamy coarse sand
	Very channery		Loamy fine sand
	Extremely channery		Loamy sand
COP			Loamy very fine sand
DIA		S	Sand
	Diatomaceous		·
FL	Flaggy	SC	Sandy clay
	Very flaggy	SCL	• •
FLX	,	SI	Silt
GR	•	SIC	Silty clay
GRC			Silty clay loam
GRF	<u> </u>	SIL	Silt loam
GRM	Medium gravelly	SL	Sandy loam
GRV	Very gravelly	VFS	Very fine sand
GRX	Extremely gravelly	VFSL	Very fine sandy loan
GS			•
GYP	•		
HB	Herbaceous		
	Hydrous		
	Medial		
MK			
MR	Marly		
	•		
MS	•		
	Parabouldery		
	Very Parabouldery		
	Extremely Parabouldery		
	Paracobbly		
	Very Paracobbly		
PCBX	Extremely Paracobbly		
PCN	Parachannery		
PCNV	Very Parachannery		
	Extremely Parachannery		
	Permanently frozen		
	Paraflaggy		
	Very Paraflaggy		
	Extremely Paraflaggy		
	Paragravelly		
	<u> </u>		
	Very Paragravelly		
	Extremely Paragravelly		
PST	Parastony		

Terms used in lieu of texture Bedrock BY Boulders CB Cobbles CN Channers DUR Duripan Flagstones FL Gravel G HPM Highly Decomposed plant mate MAT Material MPM Moderately Decomposed plant Mucky peat nd MPT MUCK Muck OR Ortstein PBY Paraboulders PC Petrocalcic PCB Paracobbles PCN **Parachanners** PEAT Peat PF Petroferric Paraflagstones PFL Paragravel m PG PGP Petrogypsic Placic PL **PST Parastones** Slightly Decomposed plant mat SPM ST Stones W Water

PSTV Very Parastony

PSTX Extremely Parastony

PT Peaty ST Stony

STV Very stony

STX Extremely stony

WD Woody

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Wastewater Application Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: NoData

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter

or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Very Low or N.A.

Manure Application Rate: N/A

Comments: NoData

Manure Phosphorus Application Method Rating: Very Low or N.A.

Manure Application Method: N/A

Comments: NoData

Irrigation Runoff Index (Irrigated)

Comments: NoData

Rating: Very Low or N.A.

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: NoData

Runoff Best Management Practices

Rating: Very Low or N.A.

List best management practices that mitigate runoff(See Appendix B)

Comments: NoData

Distance to Surface Water Body

Rating: Very Low or N.A.

Distance to Surface Water Body: 1.5

Comments: NoData

Nutrient Leaching Risk Assessment

FIELD: Wastewater Application Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply

according to crop growth needs.

Irrigation Efficiency Comments: NoData

Rating: Very Low or N.A.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

NUTRIENT RISK ANALYSIS Legend

ВМР	Definition	Purpose	
Buffer Strip	Contour buffer strips are strips of perenneal grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoffwater and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.	
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.	
Chiseling and Subsoiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.	
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.	
Conservation Cover	This practice involves	This practice reduces soil erosion,	

establishing and maintaining a protective cover of perennial vegetation on land retired from agriculture production. associated sedimentation, improves water quality, and creates or enhances wildlife habitat.

Conservation Cropping Sequence

Growing crops in a recurring sequence on the same field.

This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.

Contour Farming

Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)

To reduce erosion and control water.

Cover and Green Manure Crop

A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.

To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.

Critical Area Planting

Planting vegetation on critically eroding areas that require extraordinary treatment.

This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with

poor quality soil and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized planting techniques and management.

Dike or Berm

An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.

Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.

Diversion

A channel constructed across the slope with a supporting ridge on the lower side.

To divert excess water from one area for use or safe disposal in other areas.

Drip Irrigation

A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.

To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.

Filter Strip

A strip or area of vegetation for removing pollutants water.

A filter strip reduces pollution by by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.

Fish Stream Improvement

Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.

The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and

other	elements	of fish	hahitat
CHICL	CICILICITIS	OI HOIL	Haurtai.

Irrigation water management is

Grade Stabilization Construction	A structure used to control the grade and head cutting in natural or artificial channels.	These structures are to: Stabilize the grade and control erosion in natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.
Grassed Waterway	A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.	Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.
Grazing Land Mechanical Treatment	Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.	This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.
Heavy Use Area Protection	Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.	To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.
Irrigation Land Leveling	Reshaping the surface of land to be irrigated to planned grades.	To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by waterlogging and at the same time to provide for adequate surface drainage.

Irrigation water management is

Irrigation Water

Mana	agem	ent
TATCHTI	arviii	ULL

the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner. applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion; Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.

Mulching

Applying plant residues or other suitable materials not produced on the site to the soil surface.

To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.

Polyacrylamide (PAM)

Polyacrylamide is an organic polymer formulated to stabilize soil when applid in irrigation water.

Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and redue erosion within the field by over 90 percent.

Prescribed Grazing

Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.

Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to: 1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.

Residue Management (Conservation Tillage)

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface. This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage

snow to increase plant available moisture. Provide food and escape cover for wildlife.

Riparian Forest Buffer

A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.

The riparian forest buffer is a multipurpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.

Sediment Basin

A basin constructed to collect and store debris or sediment.

A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

Sprinkler System

A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.

To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.

Stream Channel Stabilization

Stabilizing the channel of a stream with suitable structures.

To control aggradation or degradation in a stream channel.

Streambank Protection

Using vegetation or structures to stabilize and protect banks of

To stabilize or protect banks of streams, lakes, estuaries, or

streams, lakes, estuaries, or excavated channels against scour and erosion.

excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.

Stripcropping, Contour

Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or closegrowing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.

To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.

Stripcropping, Field

Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.

To help control erosion and runoff on sloping cropland where contour stripcropping is not practical.

Subsurface Drains

A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.

The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.

Surge Irrigation

Surge irrigation is the

Surge allows a lighter application of

intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans. water with a higher efficieciency. The result is less deep percolation of water at the upper end of the field and a more uniform application.

Tailwater Recovery & Pumpback System

A facility to collect, store, and transport irrigation tailwater for reuse in a farm irrigation distribution system. To conserve farm irrigation water supplies and water quality by collecting the water that runs off the field surface for reuse on the farm.

Terraces

An earth embankment, a channel, or a combination ridge and channel constructed across the slope.

Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.

Use Exclusion

Excluding animals, people or vehicles from an area.

To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.

Water and Sediment Control Basin An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.

To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.

Watering Facility

A device (tank, trough, or other watertight container) for providing animal access to water.

To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by

providing alternative access to water.

Wetland Development/Restoration The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland.

To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Corn-Field Grain, Irrigated South ID NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area. Adequate N is necessary for maximum economic production of irrigated field corn used for silage or grain. Fertilizer N represents by far the largest share of the fertilizer costs for field corn in Idaho. The amount of N required depends on many factors that influence total corn production and quality. These factors include length of growing season, corn hybrid, previous crop, past fertilizer use, soil type, leaching hazard and previous manuring. Estimates of both the N available to corn during the season and the yield potential of the crop should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical field corn yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a good field corn yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by triticale for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in preplant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized. NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating

available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugarbeets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of field corn.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which field corn is grown occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

fertilizer N applied with the irrigation water.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to field corn. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting

off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be sidedressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =

(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Coarse-textured soils, including sandy loams, loamy soils and sands, may lose N from leaching. For these soils, sidedress a portion of the N at the time of the last cultivation. Sprinkler irrigation of corn under center pivots provides increased flexibility for providing N during the season. With sprinklers N can be injected into the system and applied with the water. On silt loam soils, split applications of N have not proven more effective as long as preplant N is adequately incorporated.

High N rates (approaching 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered.

High plant populations (above 28,000 to 30,000) and early plantings of longer season hybrids in the Treasure Valley will respond to high N rates provided there are no other limiting factors. High N rates will not compensate for reductions in stand or delayed plantings. High plant populations of field corn are more susceptible to N shortages because of greater competition among plants for limited N.

Sidedressing may cause root pruning depending on plant size, distance of shank from the row and placement depth. High N rates (above 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered. On sandy textured soils subject to leaching, sidedress a portion of the N at the time of the last cultivation. Under sprinkler irrigations, N can be injected through the lines throughout the season. On silt loam soils, split applications of N have not proven more effective as long as preplant N is adequately incorporated.

PHOSPHORUS

Adequate phosphorus (P) is necessary for maximum production of field corn. The soil test for P is based on samples collected from the first foot of soil. The soil is extracted with sodium bicarbonate.

Economic response to fertilizer P is more likely with cooler soil temperatures and soils with high lime content, particularly when planting long season hybrids. Phosphorus is an immobile nutrient that does not move appreciably from where it is placed. It should be mixed into the seedbed or banded within easy reach of the seedling roots before or during the planting operation.

POTASSIUM

Field corn requires adequate potassium (K) for optimum growth. Soil test K can be useful

in determining the need for K fertilizers. The soil sample is taken from the first foot of soil and extracted with sodium bicarbonate. Fertilizer K rates are based on soil test.

MICRONUTRIENTS

Zinc (Zn) deficiencies occur primarily on soils that are eroded, leveled or where the exposed subsoil is higher in lime. The DTPA test on soil samples collected from the first foot can be used for identifying Zn fertilizer needs. Apply 10 pounds of Zn per acre when the soil test measures less than 0.6 ppm.

Other micronutrients have not been shown to limit corn production. "Shotgun" applications of micronutrient mixtures containing boron (B), copper (Cu), iron (Fe) and manganese (Mn) "for insurance" have not been shown to be economical and are not recommended.

SULFUR (S)

The major corn-growing regions in Idaho should not experience shortages of S. Areas with S deficiencies include some irrigated areas where both the soil and irrigation water are low in S. Snake River water is known to have high S concentrations. Coarse-textured soils including sandy loams, loamy sands and sands would be more susceptible to S deficiencies than silt loam soils. Where the need for S is evident, use 30 pounds per acre of sulfate-sulfur (S04).

SALINITY (SALTS)

Field corn has a low to moderate tolerance to accumulated salts. Soils with total salt readings above 3 or 4 mmhos/cm can be cropped effectively. Readings up to 6 are also satisfactory although more careful water management may be required.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e.

insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

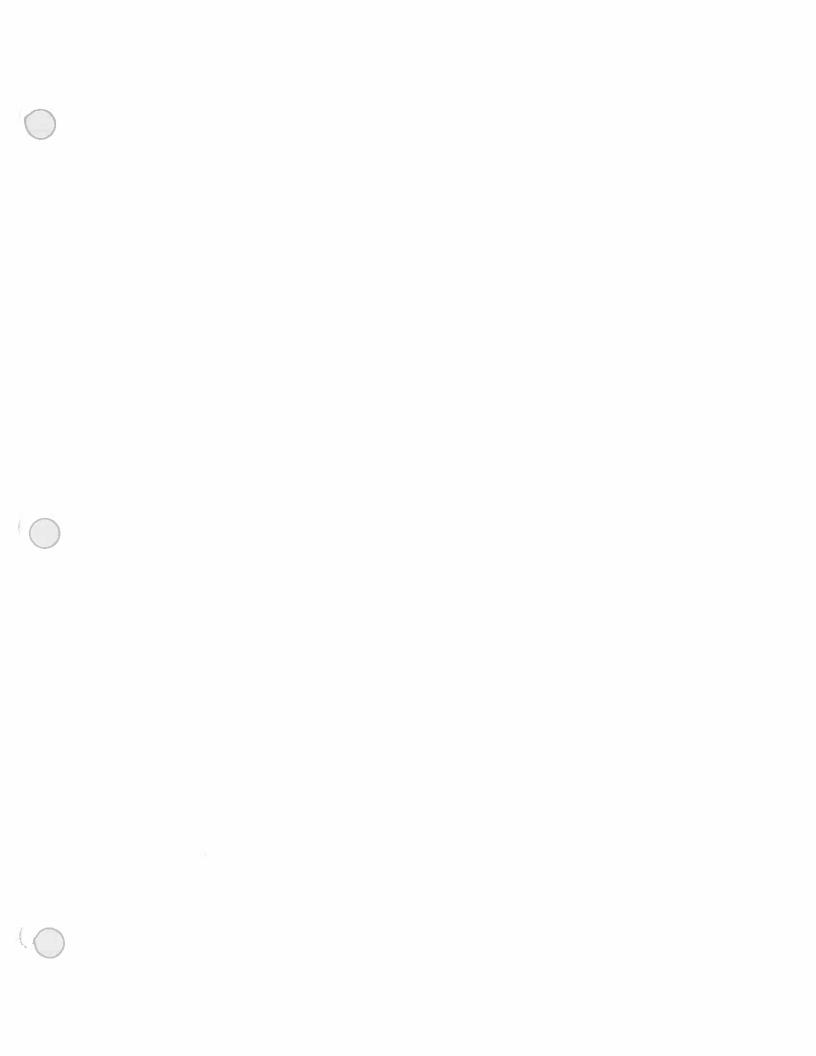
- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:
 - Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.
 - 2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.
 - 3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: NoData Date of Test: NoData

Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		NoData	NoData	
E <i>C</i>	mmhos	NoData	NoData	
PH		NoData	NoData	
%Lime	%	NoData	NoData	

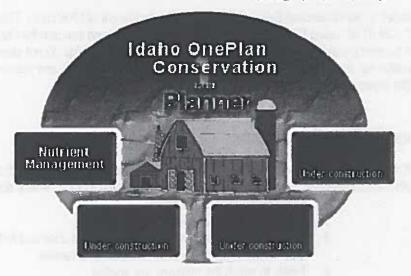
011	D/		11.5	
OW	%	NoData	NoData	
CEC	meq	NoData	NoData	
Nitrate-N	ppm	NoData	NoData	_
Ammonia-N	ppm	NoData	NoData	
Р	ppm	NoData	NoData	NoData
K	ppm	NoData	NoData	
Z	ppm	NoData	NoData	
Mn	ppm	NoData	NoData	
Fe	ppm	NoData	NoData	
Си	ppm	NoData	NoData	
Ca	ppm	NoData	NoData	
Mg	ppm	NoData	NoData	
Na	ppm	NoData	NoData	



Grandview Farm 1

Nutrient Management Plan

Agriculture . . . Launching into the Future



Nutrient Management Plan Prepared For:

Grandview Farms (208) 834-2231 Farm 1

Certified Planner:

Michael Mitchell Professional Engineer, EAC Engineering, Inc (559) 381-0607

Producer Signature:	Certificated Planner Signature:
	Date Completed: 2-04-08

FARM 1 Producer Summary

Farm Summary

Grandview Farm 1 is an existing farm located 1.8miles North of Grandview, Idaho. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of five pivot irrigated fields, six furrow irrigated fields and one furrow irrigated pasture for a total of 860 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot. Approximately 300 pasture cattle graze for 30 days each year.

Farm Resource Concerns

Farm 1 is located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 06'22" 43N 01'58" using GPS Coordinates. The primary resource concern for Farm 1 is ground water quality. One bermed canal is on the property however the surrounding fields do not slope in its direction therefore runoff is not likely to occur. Solid waste is applied to all of the fields and pasture and incorporated on fields within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

- 1. Fertilizer application rates
- 2. Manure/Compost application rates
- On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
- 4. Fields to which the nutrients are applied
- 5. Spring soil test for nitrogen (required annually) 0-12" and 12-24" nitrogen test

Crop Nutrient Requirement	
Crop	Pounds of P205 per acres
Carlot Mangara Parks	
Com	75
Pasture	73

Manure/Co	ompost field applicat	ion	requirement (tons)	
Acı	res X crop nutrient r	<u>equi</u>	rement ÷ manure p205	value* = Tons required
		SIZY.		
Example	Corn - 250(acres)	Χ	75 (crop requirement)	÷ 16.85
Com	250	X	75** = 18750	÷ 16.85* = 1112.76 tons

^{*}based on manure test values for P205

^{**}pounds of p205 required per acre

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Farm 1 ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

1) assure proper containment of animal manure and process waste water

- 2) assess resource concerns which exist on the property
- 3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.
- 4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO_i) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue). Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1): Grandview Farms

Address: 1304 Hwy 67, Grandview, ID 83624

Phone: (208) 834-2231 N/A

N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation

District:

Bruneau River

County:

Elmore

Watershed Basin:

Middle Snake-succor (USGS Hydrologic Unit Code #

17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Farm 1 is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES		CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NHO	NUTR	0_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	•
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	х

Farm 1 is <u>not</u> located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

<u>Priority 1</u> is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

<u>Priority 2</u> is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Farm 1 is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

• Open Irrigation Water Conveyances - Irrigation tail water can deliver nutrients to surface water via open canals. Nutrient loading of open canals can have a detrimental affect on the health of receiving waters.

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)			
F 1	Water Table	48			
F 10	Water Table	42			
F 11	Water Table	42			
F 2	Water Table	48			
F 3	Water Table	48			
F 4	Water Table	48			
F 5	Water Table	48			
F 6	Water Table				
F 7	Cobbles	12			
	Water Table	48			
F 8	Cobbles	12			
	Water Table	42			
F9	Cobbles	12			
	Water Table	42			
Pasture 2	Water Table	48			

Well Testing Results (See back of page):

											Bicarbonate
No	No	No Doto	No	No Dota	No Data						
Data	Data	No Dala	Data	No Dala	No Data						

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshehold Soil Test Depth
F 1	Groundwater < 5'	20	18 - 24"
F 10	Groundwater < 5'	20	18 - 24"
F 11	Groundwater < 5'	20	18 - 24"
F 2	Groundwater < 5'	20	18 - 24"
F 3	Groundwater < 5'	20	18 - 24"
F 4	Groundwater < 5'	20	18 - 24"
F 5	Groundwater < 5'	20	18 - 24"
F 6	Groundwater < 5'	20	18 - 24"
F 7	Groundwater < 5'	20	18 - 24"
F 8	Groundwater < 5'	20	18 - 24"
F9	Groundwater < 5'	20	18 - 24"
Pasture 2	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2330123.10903052, Y = 1315883.37625169 Map Scale: 1:252



Figure 1. Base Map

Farm Location

 $\frac{\text{Idaho Transverse Mercator}}{\text{Coordinates of the farm center (meters): } X = 2330123.10903052, Y = 1315883.37625169$ Map Scale: 1:45

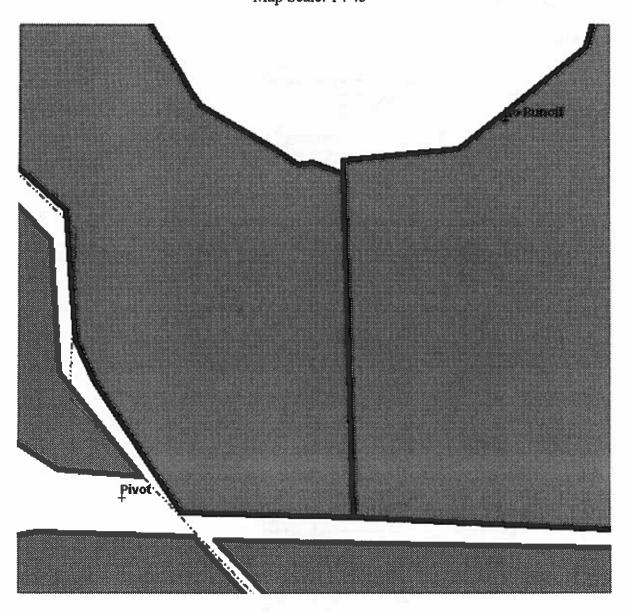


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

Assisted Mode has been turned off.

FIELD: F 1

Name	Мал Арр		Imported Nutrien	ts Mine	ralization	T	otal
			4 Trac				
Corn-Field Grain, Irrigated South ID(2004)	Y	N	46	N	0	N	46
		P	75			P	75
	- 1	ĸ	289			K	289
	1		4/T/ac				ľ
Corn-Field Grain, Irrigated South ID(2005)	Y	N	46	N	-10	N	36
		P	75	93		P	75
	00000-00	K	289			K	289
The second second			4 T/ac			3	
Corn-Field Grain, Irrigated South ID(2006)	Y	×	46	N	-10	N	36
and the county and any		P	75			P	75
		K	289			ĸ	289
	. 11		4T/sc				
Corn-Field Grain, Irrigated South ED(2007)	Y	N	46	N	25	N	71
		P	75	-50	0.00	P	75
	2	ĸ	289			K	289

FIELD: F 10

Name	Man App		Imported Nutrient	Mine	Mineralization		
			4 T/ac				
Corn-Field Grain, Irrigated South ID(2004)	Y	N	46	N	0	N	46
		P	75			P	75
	7,00	K	289		DAY.	K	289
Corn-Field Grain, Irrigated South ID(2005)			4T/Ac				- 85
	Y	N	46	N	-10	N	36
		P	75			P	75
		K	289			K	289
			4T/ac				0
Corn-Field Grain, Irrigated South ID(2006)	Y	И	46	N	-10	N	36
Curricia Comis, migates soom mysooo	'	₽	75		Division in	P	75
9		K	289			к	289
Corn-Field Grain, Irrigated South ID(2007)	Y	-	4 T/ac				

	N	46	N	25	N	71
	P	75			P	75
5 208072 3 64 20	K	289			к	289

FIELD: F 11

Name	Man App	1	Imported Nutrien	Mine	ralization	τ	otal
		T	4 Trac			Γ	Γ
Corn-Field Grain, Irrigated South ID(2004)	Y	N	46	N	0	N	46
,		P	75	100		P	75
		K	289			K	289
		Γ	4/II/sc			Γ	Γ
Corn-Field Grain, Irrigated South ID(2005)	Y	N	46	N	-10	N	36
	1	F	75			P	75
		K	289			ĸ	289
			4 Trac				
Corn-Field Grain, Irrigated South ID(2006)	Y	N	46	N	-10	N	36
	`	P	75	100		P	75
		K	289			K	289
			4 Trac				
Corn-Field Grain, Irrigated South ID(2007)	Y	Ň	46	N	25	N	71
(P	75			P	75
		к	289		D.	K	289

FIELD: F 2

Name	Man App	1	Imported Nutrient	Mine	alization	Т	otal
			4.T/ac				
Corn-Field Grain, Irrigated South ID(2004)	Y	N	46	N	0	N	46
		P	75			P	75
		K	289			ĸ	289
		Γ	4:17/ac				
Corn-Field Grain, Irrigated South (D(2005)	Y	N	46	N	-10	N	36
one soo chart angaine sould tale soo.		F	75	193		P	75
		K	289		1	ĸ	289
			4 T/ac				
Corn-Field Grain, Irrigated South ID(2006)	Y	N	46	N	-10	N	36
,		P	75			P	75
		K	289	100		к	289
			4/T/ac				
orn-Field Grain, Irrigated South ID(2007	Y	N	46	N	25	N	71
		P	75			P	75
		к	289	188		ĸ.	289

FIELD: F 3

Name	Man App		Imported Nutrients	Mine	ralization	Т	otal
			4 T/ac				8
Corn-Field Grain, Irrigated South ID(2004)	Y	N	46	N	0	N	46
		P	75	篮		P	75
	L	K	289	閲		K	289
			4T/ac				160
Corn-Field Grain, Irrigated South ID(2005)	Y	N	46	N	-10	N	36
orn-rield Orain, imgaled South iD(200:		P	75	9	Asset	P	75
		K	289	THE STATE OF		ĸ	289
			4T/ac				Ĭ
Corn-Field Grain, Irrigated South ED(2006)	Y	×	46	N	-10	N	36
		P	75	10		P	75
		K	289	纖		K	289
			4 T/ac				
Corn-Field Grain, Irrigated South ID(2007)	Y	Z	46	N	25	N	71
		P	75			P	75
		ĸ	289	遊	1913	ĸ	289

FIELD: F 4

Name	Man Ap	P	Imported Nutrient	Mine	ralization	T	otal
		T	4 T/ac				
Corn-Field Grain, Irrigated South ID(2004)	Y	N	46	N	0	z	46
		P	75		DUT.	P	75
		K	289			K	289
11.2		T	4 T/ac				
Corn-Field Grain, Irrigated South ID(2005)	Y	N	46	N	-10	Ν	36
		P	75			P	75
		K	289			ĸ	289
		T	4 T/ac				
Corn-Field Grain, Irrigated South ID(2006)	Y	N	46	N	-10	Z	36
	'	P	75			P	75
		K	289			K	289
orn-Field Grain, Irrigated South ID(2007)		T	4 T/ac				
	Y	N	46	N	25	N	71
		P	75			P	75
		K	289	373	Early H	K	289

FIELD: F 5

Name	Мап Арр		Imported Nutrients	Mineralization	Total
------	---------	--	--------------------	----------------	-------

		25000	4TD/ec			П	
Com-Field Grain, Irrigated South ID/2004)	Y	N	46	N	0	N	46
orn-Field Grain, Irrigated South ID(2004 orn-Field Grain, Irrigated South ID(2005) orn-Field Grain, Irrigated South ID(2006)	٠	P	75			P	75
		К	289	139		K	289
		100	4T/m				Г
Corn-Field Grain, Irrigated South ID(2005)	Υ	N	46	N	-10	N	36
	٠	Р	75		150	P	75
		к	289			K	289
72000330102		1000	4T/ac		50000	T	
Corn-Field Grain, Irrigated South ID(2006)	Y	N	46	N	-10	N	36
,	-	P	75		25	P	75
		к	289			К	289
			A/T/ac			Τ	Г
orn-Field Grain, Irrigated South ID(2007	Y	N	46	N	25	N	71
	-	P	75			Р	75
		К	289			ĸ	289

FIELD: F 6

Name	Man App		Imported Nutrient	Mineralization			otal
			417/ac				
Corn-Field Grain, Irrigated South ID(2004)	Y	N	46	N	0	N	46
The state of the s		P	75			P	75
		K	289		i i	K	289
			4/T/ac				Г
Corn-Field Grain, Irrigated South ID(2005)	Y	N	46	N	-10	N	36
		P	75	100		Þ	75
		K	289	鱧		ĸ	289
			4 T/ac				
Corn-Field Grain, Irrigated South ID(2006)	Y	N	46	N	-10	Z	36
		P	75			P	75
		κ	289	鬱	No.	K	289
Corn-Field Grain, Irrigated South ID(2007			4T/ac				
	Y	N	46	N	25	N	71
		Р	75			P	75
	1	K	289	323	9.3	K	289

FIELD: F 7

Name	Man App		Imported Nutrients	Mineralization			otal
Corn-Field Grain, Irrigated South ID(2004)			4 T/ac				Γ
	Y	N	46	N	0	N	46
		P	75			P	75
		ĸ	289	100	PEG.	ĸ	289

			4 T/ac				18
om-Field Grain, Irrigated South ID(2005 com-Field Grain, Irrigated South ID(2006 com-Field Grain, Irrigated South ID(2007	Y	N	46	N	-10	N	36
	•	P	75			P	75
		ĸ	289			K	289
		2000	4T/sc			П	
Corn-Field Grain, Irrigated South ID(2006	Υ	N	46	N	-10	N	36
The state of the s	ľ	P	75			P	75
		к	289			K	289
		1000	4T/ac			I	
Com-Field Grain, Irrigated South ID(2007)	Y	N	46	N	25	N	71
		P	75			P	75
		K	289		(0.5)	K	289

FIELD: F 8

Name	Man App		Imported Nutrient	Mine	ralization	Т	otal
		Ī	A T/ac				
Corn-Field Grain, Irrigated South ID(2004)	Y	N	-46	N	0	N	46
		P	75		tasa.	P	75
	1977	ĸ	289	No.		ĸ	28
			4117ac		o roke		
Corn-Field Grain, Irrigated South ID(2005)	Y	N	46	N	-10	Z	36
ones pero Giana, arragante avente per aven		P	75			P	75
		k	289			K	28
			4 T/ac				
Corn-Field Grain, Irrigated South ID(2006)	Y	N	46	N	-10	2	36
(P	75		233	P	75
		k	289	腦		K	289
Corn-Field Grain, Irrigated South ID(2007		2	4 T/ac		J. J		
	Y	N	46	N	25	Z	71
, ,		P	75			P	75
		ĸ	289		相語	K	289

FIELD: F 9

Name	Man App		Imported Nutrien	lutrients Mineralization		Т	otal
			4.T/ap		7 (1)		
Corn-Field Grain, Irrigated South ID(2004)	Y	N	46	N	0	Z	46
and the stant, angular sound to the	1	P	75			P	75
		ĸ	289			ĸ	289
			4 T/ac	1			
Corn-Field Grain, Irrigated South ID(2005)	Y	×	46	N	-10	Z	36
On-title Chan, migates sound sold sold		P	75	100		P	75
	1	K	289		107.5	ĸ	289

		100000	4 Trac				
Corn-Field Grain, Irrigated South ID(2006)	Y	N	46	N	-10	N	36
,	•	Р	75			P	75
	ı	к	289			K	289
	Y		4T/ac			T	
Corn-Field Grain, Irrigated South ID(2007)		М	46	N	25	N	71
wan s took winning attigated broads and hover,	•	P	75	1		P	75
		к	289		ME	К	289

FIELD: Pasture 2

Name	Man App		Imported Nutrient	Pasture(s)	Miner	alization	To	otal
		r	4 T/ac	1 T/sc			\prod	
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2004)	Y	N	40	1	N	0	N	41
		P	66	8			P	74
		ĸ	252	9			к	261
			4 Tiec	ljT/ac			П	
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2005)	Y	N	40	1 ,	N	22	N	63
	-	P	66	8			P	74
		K	252	9			к	261

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	702
Pasture(s)	18

The acreage in the table is based on an average crop uptake of 100 lbs P₂O₅ per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture.

Hydraulic Balance

Field	Date
F 1	April 15
F 10	March 15
F 11	April 1
F 2	April 15
F 3	April 15
F 4	April 15

F 5	April 15
F 6	April 15
F 7	April 15
F 8	April 1
F 9	April 1
Pasture 2	April 15

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test

Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, and rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: F1 Crop: Corn-Field Grain, Irrigated South ID Yield: 210

	N	P205	K20
Crop Nutrient Requirement	300	75	56
Nutrients From Soil	?		No.
from Mineralized Nitrogen	0		
from Prior Crops	-35		40
from Prior Bio-Nutrients	25		None Services
from Irrigation Water	0		0
Nutrient Balance from above	310.6	75.4	56.4
Imported Nutrients	46	75	289
Estimated Remaining Nutrients Required	265	0	-233
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	265	0	-233

Acceptable: Sustainable agronomic rate.

Field: F 10 Crop: Corn-Field Grain, Irrigated South ID Yield: 210

	N	P205	K20
Crop Nutrient Requirement	300	75	56
Nutrients From Soil	?	A SEE	話
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	310.6	75.4	56.4
Imported Nutrients	46	75	289
Estimated Remaining Nutrients Required	265	0	-233
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	265	0	-233

Field: F11 Crop: Corn-Field Grain, Irrigated South ID Yield: 210

	N	P205	K20
Crop Nutrient Requirement	300	75	56
Nutrients From Soil	?		

0		
-35		
25	TO SE	
0	No.	0
310,6	75.4	56.4
46	75	289
265	0	-233
0	0	0
265	0	-233
	-35 25 0 310,6 46 265 0	-35 25 0 310,6 75,4 46 75 265 0 0 0

Field: F2 Crop: Corn-Field Grain, Irrigated South ID Yield: 210

	N	P205	K20
Crop Nutrient Requirement	300	75	56
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	310.6	75.4	56.4
Imported Nutrients	46	75	289
Estimated Remaining Nutrients Required	265	0	-233
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	265	0	-233

Acceptable: Sustainable agronomic rate.

Field: F 3 Crop: Corn-Field Grain, Irrigated South ID Yield: 210

	N	P205	K20
Crop Nutrient Requirement	300	75	56
Nutrients From Soil	?	Mai	
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	310.6	75.4	56.4
Imported Nutrients	46	75	289
Estimated Remaining Nutrients Required	265	0	-233
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	265	0	-233

Field: F 4 Crop: Corn-Field Grain, Irrigated South ID Yield: 210

	N	P205	K20
Crop Nutrient Requirement	300	75	56
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	310.6	75.4	56.4
Imported Nutrients	46	75	289
Estimated Remaining Nutrients Required	265	0	-233
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	265	0	-233

Field: F 5 Crop: Corn-Field Grain, Irrigated South ID Yield: 210

	N	P205	K20
Crop Nutrient Requirement	300	75	56
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	25	18.0	
from Irrigation Water	0		0
Nutrient Balance from above	310.6	75:4	56.4
Imported Nutrients	46	75	289
Estimated Remaining Nutrients Required	265	0	-233
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	265	0	-233

Field: F 6 Crop: Corn-Field Grain, Irrigated South ID Yield: 210

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	N	P205	K20
Crop Nutrient Requirement	300	75	56
Nutrients From Soil	?		
from Mineralized Nitrogen	0	色變	
from Prior Crops	-35		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	310.6	75.4	56.4
Imported Nutrients	46	75	289

Estimated Remaining Nutrients Required	265	0	-233
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	265	0	-233

Field: F7 Crop: Corn-Field Grain, Irrigated South ID Yield: 210

	N	P205	K20
Crop Nutrient Requirement	300	75	56
Nutrients From Soil	?	La Carlo	FUE
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	25		
from Irrigation Water	0	1	0
Nutrient Balance from above	310.6	75.4	56.4
Imported Nutrients	46	75	289
Estimated Remaining Nutrients Required	265	0	-233
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	265	0	-233

Acceptable: Sustainable agronomic rate.

Field: F 8 Crop: Corn-Field Grain, Irrigated South ID Yield: 210

	N	P205	K20
Crop Nutrient Requirement	300	75	56
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient/Balance from above	310.6	75.4	56.4
Imported Nutrients	46	75	289
Estimated Remaining Nutrients Required	265	0	-233
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	265	0	-233

Field: F 9 Crop: Corn-Field Grain, Irrigated South ID Yield: 210

	N	P205	K20
Crop Nutrient Requirement	300	75	56
Nutrients From Soil	?		
from Mineralized Nitrogen	0		

-35		
25		
0		0
310.6	75.4	56.4
46	75	289
265	0	-233
0	0	0
265	0	-233
	25 0 310.6 46 265 0	25 0 310.6 75.4 46 75 265 0 0 0

Field: Pasture 2 Crop: Pasture, Irrigated South ID - Good Condition Root Depth 4 feet Yield: 4

	N	P205	K20
Crop Nutrient Requirement	150	73	207
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	22		
from Irrigation Water	0		0
Nutrient Balance from above	178.0	73.3	207.4
Imported Nutrients	40	66	252
Pasture(s)	1	8	9
Estimated Remaining Nutrients Required	88	-1	-54
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	88	-1	-54

Caution: Rate is either deficit or is approaching an amount that may potentially contribute to an environmental risk.

ANALYSIS OF ANIMAL SYSTEM

WASTE STORAGE AND HANDLING

Livestock Unit Characteristic

Description	Animal	Number	Weight	Days Collected		Bedding Type	Bedding (tons)
	Beef - High forage diet	300	700	30	Open Lot	N/A	0

Manure/Biosolid Groups

Manure Group	Storage Type	Application Method	Days to Incorporation	Nitrogen Retention(%)	Annual Volume (ft3)	Annual Weight (tons)
Imported Nutrients	Manure Stored in Open Lot, Arid Region	Broadcast, Incorporated less than 3 inches	>7 days	70	901,923	3,752
Pasture(s)	Pasture	Broadcast, Incorporated less than 3 inches	>7 days	14	6,300	198

^{*} in Nitrogen Retention % Column means "Overridden Nitrogen Values" Assisted Mode has been turned off.

Manure Group		Pasture Cattle
Pasture(s)	% To	100
	Group	

Annual Production of Nutrients

The nutrient values were calculated based on animal weight and nitrogen loss estimates as described in the NRCS Agricultural Waste Management Field Handbook guidelines (1996). The calculations are estimates, and manure testing is recommended for more accuracy, as manure nutrient content varies widely among operations.

Nutrient Distribution on Facility					
	Pounds N	Pounds P ₂ 0 ₅	Pounds K ₂ 0	% of Total	
Total Nutrients Produced	85368	64807	244426		

Imported Nutrients	85095	63221	242604	99
Pasture(s)	273	1586	1822	1

Comments on Bionutrients

No Comments

MANURE STORAGE SUMMARY

Total Solid Capacity					
Bio-Nutrient Group	Cubic Feet	% Contained			
Pasture(s)	6,300	0%			
Imported Nutrients	901,923	0%			

Containment of Waste Corral Runoff

It is important that all contaminated runoff from corrals be contained and/or diverted to the lagoon storage system. As stated in the Idaho State Department of Agriculture (ISDA) regulation, a discharge is allowed only under large precipitation events (>25yr, 24hr storm event). Lagoon structures must be properly designed, operated, and maintained to contain all wastewater and contaminated runoff from a 25-year, 24-hour rainfall event for the site location and maintained to contain all runoff from accumulation of winter precipitation from a one in five-year winter. Animals confined in the CAFO may not have direct contact with canals, streams, lakes, or other surface waters.

Comments

No Comments

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary							
Bio-Nutrient Group Name	Amount	Consumer	Consumer's Address	Telephone	Acres		
No manure exported from this facility							

ANALYSIS OF CROPPING SYSTEM

Farming Operation

Total Acres: 860.9

Crop Production History

THIS IS NOT A FERTILIZER RECOMMENDATION

Crop Rotation Name: Rotation A

Спор	Yield	Yield Units	N Requirement	P ₂ 0 ₅ uptake	K ₂ 0 Requirement
Corn-Field Grain, Irrigated South ID	210	bu/acre	300	75.4	240
Corn-Field Grain, Irrigated South ID	210	bu/acre	300	75.4	240
Corn-Field Grain, Irrigated South ID	210	bu/acre	300	75.4	240
Average				75	

^{*} Nitrogen and Potassium Requirements assume zero credits.

THIS IS NOT A FERTILIZER RECOMMENDATION

Crop Rotation Name: Rotation B

Crop	Yield	Yield Units	N Requirement	P ₂ 0 ₅ uptake	K ₂ 0 Requirement
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet	4	tons/acre	150	73.3	200
Average				73	

^{*} Nitrogen and Potassium Requirements assume zero credits.

Mapped Resource Concern(s)

Field Name	Acres	Resource Concern(s)
F 4	86.4	Open Irrigation Water Conveyances
F 5	90.2	Open Irrigation Water Conveyances
Pasture 2	204.7	Open Irrigation Water Conveyances

ANALYSIS OF IRRIGATION PRACTICES

Irrigation Management

Proper irrigation management depends on factors such as the following.

Irrigation Efficiency: The efficiency with which the irrigation wets the entire crop root zone. This takes losses that occur from evaporation, runoff and deep percolation.

Crop Evapotranspiration Rate (ET): The combined rate at which water from the soil profile is evaporated into the atmosphere and transpired from the crop. The rate is expressed in units of inches/day.

Management Allowable Depletion (MAD): The percentage of water, which can be depleted from the soil before the crop, experiences water deficiency stress.

Available Water Holding Capacity in the Soil (AWH): The amount of water the pores in the soil profile can hold against gravity. The AWH is expressed as inches of water per inch of soil.

Crop Rooting Depth: The depth in the soil profile to which the crop roots can penetrate.

			Surface Irrigation Field Nan				1
Date of	Initial Irrigation:						
Current	Crop		Corn-Field Grain, Irrig	ated South ID			
Furrow	Flow Rate			.0 g	pm		
Deliver	y Method			N/A			
Furrow	Length			.0 f			
Furrow	Spacing			.0 f	ì		
Time to	Reach End of Fur	row		.0 h	ours		
Month	Days Between Irrigation	Set Time (hours)	Irrigation Application Efficiency		Net Irrigation Requirement (in)	Deep Perc.	Runoff Index
Mar	.0	.0	.0	.0	.0	.0	.0
Apr	.0	.0	.0	.0	.0	.0	.0
May	.0	.0	.0	.0	1.1	.0	.0
Jun	.0	.0	.0	.0	3.3	.0	.0
Jul	.0	.0	.0	.0	7.7	.0	.(

Aug	.0	.0	.0	.0	6.3 .0 .0
Sep	.0	.0	.0	.0	2.5 .0 .0
Oct	.0	.0	.0	.0	0. 0. 0.

Surface Irrigation Summary

Field Name: F 5

Date of Initial Irrigation:

Current Crop Corn-Field Grain, Irrigated South ID

Furrow Flow Rate .0 gpm

Delivery Method N/A
Furrow Length .0 ft

Furrow Spacing .0 ft

Time to Reach End of Furrow .0 hours

Month	Days Between Irrigation	Set Time (hours)	Irrigation Application Efficiency	Water Applied (in)	Net Irrigation Requirement (in)	Deep Perc.	Runoff Index
Mar	.0	.0	.0	.0	.0	.0	.0
Apr	.0	.0	.0	.0	.0	.0	.0
May	.0	.0	.0	.0	- 1.1	.0	.0
Jun	.0	.0	.0	.0	3.3	.0	.0
Jul	.0	.0	.0	.0	7.7	■.0	.0
Aug	.0	.0	.0	.0	6.3	.0	.0
Sep	.0	.0	.0	.0	2.5	.0	.0
Oct	0.	.0	.0	.0	0	.0	.0

Pivot Irrigation Summary

Field Name: F 7

Evaporation/Drift Losses: 20.0 %

Date of Initial Irrigation: 5/1/2005

Current Crop Corn-Field Grain,

System Flow Rate: Irrigated South ID

2050.0 gi

System Flow Rate: 2050.0 gpm Length of Pivot: 503 ft

Estimated Runoff: .0 in

Month Days Between One Pivot Water Applied (in) Net Irrigation Deep Irrigation
Irrigation Cycle (hrs) Water Applied (in) Requirement (in) Perc. Deficit (in)

Mar		.0	.0	.0	.0	.0	.6
Apr		.0	.0	.0	.0	.0	6
May 7	.0	6.0	1.5	1.1	3.6	.0	
Jun		3.0	6.0	1.5	3.3	8.8	.0
Jul		3.0	6.0	1.5	7.7	5.2	.0
Aug		3.0	6.0	1.5	6.3	5.8	.0
Sep		5.0	6.0	1.5	2.5	4.5	.0
Oct		.0	.0	.0	.0	.0	.0

Pivot Irrigation Summary

Field Name: F 10

Evaporation/Drift Losses: 20.0 %

Date of Initial Irrigation: 5/1/2005

Current Crop Corn-Field Grain,
Irrigated South ID

System Flow Rate: 630.0 gpm

Length of Pivot: 1017 ft
Estimated Runoff: .0 in

Days Between One Pivot Net Irrigation Deep Irrigation Month Water Applied (in) Deficit (in) Cycle (hrs) Requirement (in) Perc. Irrigation Mar 0. .0 .0 .0 .0 .0 .0 .0 .0 .0 Арг 7.0 1.1 0. .0 May 24.0 Jun 3.0 24.0 3.3 0. .0 .4 Jui 3.0 24.0 .4 7.7 0. .0 Aug 3.0 24.0 .4 6.3 0. 2.1 2.5 0. 2.7 Sep 5.0 24.0 .4 .0 0. .0 Oct 0. .0

Pivot Irrigation Summary

Field Name: F 11

Evaporation/Drift Losses: 20.0 %

Date of Initial Irrigation: 5/1/2005

Current Crop Corn-Field Grain, Irrigated South ID

System Flow Rate: 100.0 gpm

Length	of Pivot:			288 ft			
Estima	ted Runoff:			.0 in			
Month	Days Between Irrigation	One Pivot Cycle (hrs)		Water Applied (in)	Net Irrigation Requirement (in)		Irrigation Deficit (in)
Mar	.0	.0		.0	.0	.0	.0
Арг	.0	.0		.0	.0	.0	.0
May	7.0	4.0	.9	1.1		1.0 .0	
Jun	3.0	24.0		.9	3.3	4.0	.0
Jul	3.0	24.0		.9	7.7	.2	.0
Aug	3.0	24.0		.9	6.3	.7	.0
Sep	5.0	24.0		.9	2.5	1.6	.0
Oct	.0	.0		.0	.0	.0	.0

			Surface Irrigation	n Summary			
			Field Name:	Pasture 2			•
Date of	Initial Irrigation:						
Current	1 7		Pasture, Irrigated S Condition Ro	outh ID - Good oot Depth 4 feet			
Furrow	Flow Rate			.0	gpm		
Deliver	y Method			N/A			
Furrow	Length			.0	ft		
Furrow	Spacing			.0	ft		
Time to	Reach End of Fu	поw		.0	hours		
Month	Days Between Irrigation	Set Time (hours)	Irrigation Application Efficiency		_	Deep Perc.	Runoff Index
Mar	.0	.0	.0	.0	.4	.0	.0
Apr	.0	.0	.0	.0	1.7	.0	.0
May	.0	.0	.0	.0	3.0	.0	.0
Jun	.0	.0	.0	.0	4.5	.0	.0
Jul	.0	.0	.0	.0	6.5	.0	.0
Aug	0	.0	.0	.0	5.5	.0	.0
Sep	.0	.0	.0	.0	3.0	.0	.0
Oct	.0	.0	.0	.0	1.3	.0	.0

Appendix A: ANALYSIS OF SOIL CHARACTERISTICS

Soil Survey (USDA NRCS) information was used to describe the soil variations across each field. This is not absolute and may vary for each specific situation. The soil map has broad areas that have distinctive pattern of soils, relief, and drainage. Each map unit on the soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. Because the minor soils are not described in the following summary, the combined acreage for all major soils will be less than the acreage for each field.

Table 1. Soil type across each field

Field Name	Soil Type	Percentage	Approximate Acreage	Surface Texture ¹
F 1	LETHA	80	57.77	FSL
F 10	MAZUMA	75	1.23	FSL
	GRANDVIEW	80	47.56	L
	LETHA	80	10.9	FSL
F 11	MAZUMA	75	0.44	FSL
	LETHA	80	3.23	FSL
	GRANDVIEW	80	1.08	L
F 2	LETHA	80	21.1	FSL
F 3	LETHA	80	31.75	FSL
F 4	LETHA	80	69.11	FSL
F 5	LETHA	80	72.15	FSL
F 6	LETHA	80	18.89	FSL
F 7	ORNEA	80	0.19	GR-L
	LETHA	80	14.47	FSL
F 8	LETHA	80	23.53	FSL
	GRANDVIEW	80	5.31	L
	ORNEA	80	54.32	GR-L
F 9	LETHA	80	9.77	FSL
_	GRANDVIEW	80	43.61	L
	ORNEA	80	37.15	GR-L

	MAZUMA	75	1.25	FSL
Pasture 2	LETHA	80	163.74	FSL

Note: 1- See Appendix A.

Table 2 contains important soil characteristics for each of the fields identified in this plan. Each soil characteristic listed is representative for the entire field based on a weighted average. (Caution: USDA NRCS Soil Survey information was used to estimate the values reported in Table 2. These are not absolute values and may vary for each specific situation. They are estimated values representative for each field.) The following includes a brief description of each of those factors:

Dominant Surface Texture -- The predominant texture of the surface layer. Soil texture is the relative proportion, by weight, of the particle separate classes (sand, silt, and clay) finer than 2 mm in equivalent diameter. Soil texture influences engineering works and plant growth and is used as an indicator of how soils formed. (See Appendix A)

Available Water Capacity (AWC) — The volume of water that should be available to plants if the soil, inclusive of fragments, were at field capacity. It is commonly defined as the difference between the amount of soil moisture at field capacity and the amount at permanent wilting point. Typical Available Water Capacities are 0.6 inches/foot for a Sand and 2.0 inches/foot for a Silt Loam. Available Water Capacity is an important soil property in developing water budgets, predicting droughtiness, designing and operating irrigation systems, designing drainage systems, protecting water resources, and predicting yields.

Surface Soil Erodibility Factor (K) -- A factor which quantifies the susceptibility of soil detachment by water. Factors vary from a low of 0.02 to a high of 0.64.

Soil Loss Tolerance (T) -- The maximum amount of erosion at which the quality of a soil as a medium for plant growth can be maintained.

Slope -- The difference in elevation between two points expressed as a percentage of the distance between those points.

Permeability -- The quality of the soil that enables water or air to move through it.

Permeability Class -- Permeability expressed by classes ranging from very rapid to impermeable. (See Appendix A)

Runoff Class - An index of the likelihood for runoff to occur based on inherent soil and slope characteristic. Runoff classes range from Negligible to Very High. (See Appendix A)

Surface pH -- A numerical expression of the relative acidity or alkalinity of the surface soil layer.

Surface pH Classification -- A general descriptive term for soil pH, acid or alkaline.

Table 3 contains additional important soil characteristics for each of the fields identified in this plan. Each soil characteristic listed represents a potential limiting condition within the soil profile (< 5 feet) across the field. (Caution: USDA NRCS Soil Survey information was used to estimate the values reported in Table 2. These are not absolute values and may vary for each specific situation. They are estimated values representative for each field.) The following includes a brief description of each of those factors:

Soil Layer with > 50 % Gravel, Cobble or Stone -- A layer comprised of more than 50 % gravel, cobbles or stones.

Pan - A compact, dense layer in the soil that impedes the movement of water and the growth of roots. Examples include *hardpan*, *claypan*, *plowpan*, and *Fragipan*. (See Appendix A)

Rock -- A layer of rock in the soil that impedes the movement of water and the growth of roots.

Seasonal High Water Table -- A seasonal water table that exist near the surface.

Drainage Class - Drainage class identifies the natural drainage condition of the soil. It refers to the frequency and duration of wet periods. Alteration of the water regime by humans, either through drainage or irrigation, is not a consideration unless the alterations have significantly changed the morphology of the soil. (See Appendix A)

Hydrologic Group -- A group of soils having similar runoff potential under similar storm and cover conditions.

Table 2. Soil characteristics representative for each field

				Rep	resentative For En	tire Field (Weighte	ed Aver	age)				
Field Name	Dominant Surface Texture & (Acreage) ¹	Total Available Water Capacity to 5 feet (in)	Surface Soil Erodibility Factor - K	Soil Loss Tolerance - T (tons/acre)	Calculated Sheet and Rill Erosion Rate ¹ (tons/acre)	Calculated Irrigation Induced Erosion Rate ¹ (tons/acre)		Permeability (in/hour)	Permeability Class ^{1,2}	Runoff Class ¹³	Surface pH	Surface pH Classification
FI	FSL(66.69)	6.48	0.24	.4.	-1	*1	2	1.27	Moderate	L	8.45	Alkaline
F 10	L(59,33)	10.16	0.39	5	0 =	-1	2	0.44	Moderately Slow	L.	8,43	Alkaline
FIL	FSL(6.05)	7.47	0.28	4	-1	pr.=1:	2	1.31	Moderate	L	8.4	Alkaline
F2	FSL(26.62)	6.48	0.24	4	-1	-1	2	1.28	Moderate	L	8.46	Alkaline
F3	FSL(41.08)	6.48	0.24	4	-t	-l	2	1.27	Moderate	L	8.44	Alkaline
F 4	FSL(94.15)	6.48	0.24	4	-l	-1	2	1.27	Moderate	L	8.45	Alkaline
F 5	FSL(104.69)	6.48	0.24	4	-1	-1	2	1.27	Moderate	L	8.45	Alkaline
F6	FSL(22.78)	6.48	0.24	4	-l	-1	2	1.27	Moderate	L	8.44	Alkaline
F 7	FSL(18.09)	6.44	0.24	4	-1	-1	2.04	1.27	Moderate	L	8.46	Alkaline
F8	GR-L(66.13)	4.53	0.23	3	= -1	-1	3.96	0.62	Moderate	L	8.36	Alkaline
F 9	L(54.51)	7.3	0.31	4	-1	-1	3.21	0.41	Moderately Slow	L_	8.38	Alkaline
Pasture 2	FSL(196.75)	6,48	0.24	4	-1	(-1)	2	1.28	Moderate	L	8.45	Alkaline

NOTES:

- 1 See Appendix A;
- 2 PERMEABILITY CLASSES: VR = Very Rapid, R = Rapid, MR = Moderately Rapid, M = Moderate, MS = Moderately Slow, S = Slow, VS = Very Slow, I = Impermeable;
- 3 RUNOFF CLASS: N = Negligible, LV = Very Low, L = Low, M = Medium, H = High, HV = Very High;

Table 3. Soil characteristics that represent a potential limiting condition within the soil profile (< 5 feet) across the entire field.

Field Name		yer < 5 (eet - Soil Layer with >	50 % (Gravel, Cobble or Stone	r	Depth to	Limiting Layer <	5 feet -	Pan ¹
	Dominant Condit	ion	Most Limiting Condition			Dominant Cond	lition	Most L	imiting	Condition
	Layer Description ^{1,2}	Acres	Layer Description ^{1,3}	Acres	Minimum Depth (in)	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)
F1	None Present	66.69		66,69	0	No Pan Present	66,69	No Pan Present	66.69	0
F IO	None Present	75.26		75.26	0	No Pan Present	75.26	No Pan Present	75.26	0
F11	None Present	7.5		7.5	0	Pan Present	7.5	Pan Present	7.5	0
F2	None Present	26.62		26.62	0	Pan Present	26.62	Pan Present	26,62	0
F3	None Present	41.08	= =	41.08	0	Pan Present	41.08	Pan Present	41.08	0
F 4	None Present	94.15		94,15	0	No Pan Present	94.15	No Pan Present	94,15	0
F 5	None Present	104,69		104.69	0	No Pan Present	104.69	No Pan Present	104.69	0
F 6	None Present	22,78		22.78	0	Pan Present	22.78	Pan Present	22,78	0
F 7	None Present	18.09	GRV GRX CBV	0.23	12	Pan Present	18.32	Pan Present	18.32	0
F8	GRV GRX CBV	66,13	GRV GRX CBV	66.13	12	No Pan Present	101.44	No Pan Present	101.44	0
F9	None Present	68.39	GRV GRX CBV	46.43	12	No Pan Present	114.82	No Pan Present	114.82	0
Pasture 2	None Present	196,75		196.75	0	No Pan Present	196,75	No Pan Present	196.75	0

Field Name	9		Limiting Layer < 5 fee		60°.	Depth to Limiting Layer < 5 feet - Seasonal High Water Table				
	Dominant Condit	ion	Most Limiting Condition			Dominant Conditi	on	Most Lim	iting Co	ndition
	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)
FI	No Rock Layer Present	66.69	No Rock Layer Present	66,69	N/A	No Water Table Present	66,69	No Water Table Present	66.69	4
F 10	No Rock Layer Present	75.26	No Rock Layer Present	75.26	N/A	No Water Table Present	73,16	Water Table Present	59.33	3.5
F 11	No Rock Layer Present	7.5	No Rock Layer Present	7.5	N/A	Water Table Present	6.79	Water Table Present	1.46	3.5
F 2	No Rock Layer Present	26.62	No Rock Layer Present	26.62	N/A	Water Table Present	26.62	Water Table Present	26.62	∏ 4
F 3	No Rock Layer Present	41,08	No Rock Layer Present	41.08	N/A	Water Table Present	41.08	Water Table Present	41.08	4
F4	No Rock Layer Present	94,15	No Rock Layer Present	94,15	N/A	No Water Table Present	94.15	No Water Table Present	94.15	4
F 5	No Rock Layer Present	104.69	No Rock Layer Present	104.69	N/A	No Water Table Present	104.69	No Water Table Present	104.69	4
F6	No Rock Layer Present	22.78	No Rock Layer Present	22.78	N/A	Water Table Present	22.78	Water Table Present	22.78	4
F 7	No Rock Layer Present	18.32	No Rock Layer Present	18.32	N/A	Water Table Present	18.09	Water Table Present	18.09	4
F8	No Rock Layer Present	101.44	No Rock Layer Present	101,44	N/A	No Water Table Present	66.13	Water Table Present	6.61	3.5
F 9	No Rock Layer Present	114.82	No Rock Layer Present	114.82	N/A	No Water Table Present	66.72	Water Table Present	54.51	3.5
Pasture 2	No Rock Layer Present	196.75	No Rock Layer Present	196.75	N/A	No Water Table Present	196.75	No Water Table Present	196.75	4

Field Name	Drainage Class ^{1,3}		Hydrologic Group ^t	
	Dominant Drainage Class	Acres	Dominant Hydrologic Group	Acres
F1	Moderately well drained	66.69	С	66.69
F 10	Moderately well drained	73.16	С	73,16
F11	Moderately well drained	6.79	С	6.79
F 2	Moderately well drained	26.62	С	26.62
F3	Moderately well drained	41.08	С	41.08
F 4	Moderately well drained	94.15	С	94.15
F 5	Moderately well drained	104.69	C	104.69

F6	Moderately well drained	22.78	C	22.78
F 7	Moderately well drained	18.09	С	18.09
F8	Well drained	66.13	В	66.13
F9	Moderately well drained	66,72	С	66.72
Pasture 2	Moderately well drained	196.75	C	196.75

NOTES:

- 1 See Appendix A;
- 2 GRAVEL, COBBLE, or STONE: GRV = Very Gravelly, GRX = Extremely Gravelly, CBV = Very Cobbly, CBX = Extremely Cobbly, STV = Very Stony, STX = Extremely Stony, WB = Weathered Bedrock, and UWB = Unweathered Bedrock;
- 3 DRAINAGE CLASS: E = Excessively drained, SE = Somewhat Excessively drained, W = Well drained, MW = Moderately Well drained, SP = Somewhat Poorly drained, P = Poorly drained, VP = Very Poorly drained;

ANALYSIS OF SOIL CHARACTERISTICS Legend

Soil Pan

Hardpan – A hardened or cemented layer soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Claypan – A slowly permeable soil horizon that contains much more clay than the horizon above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Plowpan - A compacted layer formed in the soil directly below the plow layer.

Fragipan – A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restrict roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than deform slowly.

Soil Drainage Class

Excessively drained (E). Water is removed very rapidly. The occurrence of internal free water commonly is very rare or very deep. The soils are commonly coarse-textured and have very high hydraulic conductivity or are very shallow. They are not suited to crop production unless irrigated.

Somewhat excessively drained (SE). Water is removed from the soil rapidly. Internal free water occurrence commonly is very rare or very deep. The soils are commonly coarse-textured and have high saturated hydraulic conductivity or are very shallow. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained (W). Water is removed from the soil readily but not rapidly. Internal free water occurrence commonly is deep or very deep; annual duration is not specified. Water is available to plants throughout most of the growing season in humid regions. Wetness does not inhibit growth of roots for significant periods during most growing seasons.

Moderately well drained (MW). Water is removed from the soil somewhat slowly during some periods of the year. Internal free water occurrence commonly is moderately deep and transitory through permanent. The soils are wet for only a short time within the rooting depth during the growing season, but long enough that most mesophytic crops are affected. They commonly have a moderately low or lower saturated hydraulic conductivity in a layer within the upper 1 m, periodically receive high rainfall, or both.

Somewhat poorly drained (SP). Water is removed slowly so that the soil is wet at a shallow depth for significant periods during the growing season. The occurrence of internal free water commonly is shallow to moderately deep and transitory to permanent. Wetness markedly restricts the growth of mesophytic crops, unless artificial drainage is provided. The soils commonly have one or more of the following characteristics: low or very low saturated hydraulic conductivity, a high water table, additional water from seepage, or nearly continuous rainfall.

Poorly drained (P). Water is removed so slowly that the soil is wet at shallow depths periodically during the growing season or remains wet for long periods. The occurrence of internal free water is shallow or very shallow and common or persistent. Free water is commonly at or near the surface long enough during the growing season so that most mesophytic crops cannot be grown, unless the soil is artificially drained. The soil, however, is not continuously wet directly below plow-depth. Free water at shallow depth is usually present. This water table is commonly the result of low or very low saturated hydraulic conductivity of nearly continuous rainfall, or of a combination of these.

Very poorly drained (VP). Water is removed from the soil so slowly that free water remains at or very near the ground surface during much of the growing season. The occurrence of internal free water is very shallow and persistent or permanent. Unless the soil is artificially drained, most mesophytic crops cannot be grown. The soils are commonly level or depressed and frequently ponded. If rainfall is high or nearly continuous, slope gradients may be greater.

Soil Hydrologic Group

Group A – Soils that have low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands and gravels. These soils have a high rate of water transmission (greater than 0.30 in/hr).

Group B – Soils that have moderate infiltration rates when thoroughly wetted. They consist chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission (greater than 0.15 - 0.30 in/hr).

Group C – Soils that have low infiltration rates when thoroughly wetted. They consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine texture. These soils have a low rate of water transmission (greater than 0.05 - 0.15 in/hr).

Group D – Soils that have high runoff potential. They have very low infiltration rates when thoroughly wetted. They consist chiefly of clay soils with high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over impervious material. These soils have a very low rate of water transmission (greater than 0.0 - 0.05 in/hr).

Soil Permeability Class

Very Rapid: 20.0 to 100.0 inches/hour

Rapid: 6.0 to 20.0 inches/hour

Moderately Rapid: 2.0 to 6.0 inches/hour

Moderate: 0.6 to 2.0 inches/hour

Moderately Slow: 0.2 to 0.6 inches/hour

Slow: 0.06 to 0.20 inches

Very Slow: 0.0015 to 0.06 inches/hour

Impermeable: 0.0000 to 0.0015 inches/hour

Soil Texture Modifiers, Texture Class and Terms Used in Lieu of Texture.

Textur	e Modifiers	Textu	re Class
ASHY	Ashy	C	Clay
BY	Bouldery	CL	Clay loam
BYV	Very bouldery	COS	
BYX			Coarse sandy loam
CB	Cobbly		Fine sand
CBV		FSL	Fine sandy loam
CBX	Extremely cobbly	L	Loam
CN	Channery		Loamy coarse sand
CNV	Very channery	LFS	Loamy fine sand
CNX	Extremely channery	LS	Loamy sand
COP	Coprogenous		Loamy very fine san
DIA	Diatomaceous	S	Sand
FL	Flaggy	SC	Sandy clay
FLV	Very flaggy	SCL	Sandy clay loam
FLX	Extremely flaggy	SI	Silt
GR	Gravelly	SIC	:
GRC	•		Silty clay loam
GRF	Fine gravelly	SIL	Silt loam
GRM		SL	Sandy loam
GRV	Very gravelly		Very fine sand
GRX	Extremely gravelly		Very fine sandy loan
GS	Grassy		,
GYP	Gypsiferous		
HB	Herbaceous		
HYDR	Hydrous		
MEDL	Medial		
MK	Mucky		
MR	Marly		
MS	Mossy		
PBY	Parabouldery		
	Very Parabouldery		
	Extremely Parabouldery		
PCB	Paracobbly		
PCBV	Very Paracobbly		
PCBX	Extremely Paracobbly		
PCN	Parachannery		
PCNV	Very Parachannery		
PCNX	Extremely Parachannery		
PF	Permanently frozen		
	Paraflaggy		
	Very Paraflaggy		
	Extremely Paraflaggy		
PGR	Paragravelly		

Terms used in lieu of texture Bedrock BR BY **Boulders** Cobbles CB CN Channers DUR Duripan Flagstones FLG Gravel HPM Highly Decomposed plant mate MAT Material MPM Moderately Decomposed plant nd MPT Mucky peat **MUCK Muck** OR Ortstein PBY Paraboulders PC Petrocalcic **PCB Paracobbles** PCN Parachanners PEAT Peat Petroferric PF **Paraflagstones** PFL Paragravel m PG **PGP** Petrogypsic Placic PL PST **Parastones** SPM Slightly Decomposed plant mat ST Stones W Water

PGRV Very Paragravelly

PGRX Extremely Paragravelly

PST Parastony

PSTV Very Parastony

PSTX Extremely Parastony

PT Peaty ST Stony

STV Very stony

STX Extremely stony

WD Woody

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: F 1

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P

Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter

or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 75.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 10

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter

or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 75.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 11

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if

your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter

or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 75.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan

will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic $P \ge 2$ " or plow; otherwise incorporate ≥ 3 " by disking, chiseling, etc. Where phosphorus is applied with irrigation,

time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term

sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 2

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P

Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter

or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Rating: Very High

Manure Application Rate: 75.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan

will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very High

Comments: Reduce surface irrigation flows and/or field slope; or capture tail-water and use a pumpback to reapply tail-water; or if possible and appropriate convert to sprinkler irrigation.

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term

sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 3

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter

or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 75.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very High

Comments: Reduce surface irrigation flows and/or field slope; or capture tail-water and use a pumpback to reapply tail-water; or if possible and appropriate convert to sprinkler irrigation.

Surface Irrigation or Overhead Irrigation

Comments: No Data

Rating: Very Low or N.A.

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term

sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 4

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if

your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 75.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Rating: Medium

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very High

Comments: Reduce surface irrigation flows and/or field slope; or capture tail-water and use a pumpback to reapply tail-water; or if possible and appropriate convert to sprinkler irrigation.

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 5

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if

your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter

or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 75.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan

will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term

sustainability of this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Rating: Very High

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 6

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 75.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very High

Comments: Reduce surface irrigation flows and/or field slope; or capture tail-water and use a pumpback to reapply tail-water; or if possible and appropriate convert to sprinkler irrigation.

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term

sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 7

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Rating: Very Low or N.A.

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter

or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 75.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan

will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term

sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system, or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F8

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter

or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 75.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan

will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very High

Comments: No Data

Surface Irrigation or Overhead Irrigation

Comments: No Data

Rating: Very Low or N.A.

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F9

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 75.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Rating: Medium

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff N/A

Rating: Very High

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term

sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Pasture 2

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if

your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter

or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 73.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term

sustainability of this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Rating: Very High

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: F 1

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pumpback System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize

leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: F 10

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth

Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: F 11

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a

Rating: High

significant concern.

FIELD: F 2

Overall Risk Rating: Very High

Leaching losses are likely contributing to soluble nutrient leaching below the root zone during most years. Nutrient management practices must be intense.

Percolation Rating: Very High

Deep Percolation (as % of Evapotranspiration): >40% Over ET

Comments: High potential for soluble nutrient leaching to occur. Nitrogen losses from denitrification will probably occur. Apply water according to crop requirements. Do not apply nitrogen prior to leaching events. Water logging and poor soil aeration may negatively affect crop yields (in some areas of field).

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Potential for yield reduction from a nitrogen deficiency. Use soil and/or

plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pumpback System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: F 3

Overall Risk Rating: Very High

Leaching losses are likely contributing to soluble nutrient leaching below the root zone during most years. Nutrient management practices must be intense.

Percolation

Rating: Very High

Deep Percolation (as % of Evapotranspiration): >40% Over ET

Comments: High potential for soluble nutrient leaching to occur. Nitrogen losses from denitrification will probably occur. Apply water according to crop requirements. Do not apply nitrogen prior to leaching events. Water logging and poor soil aeration may negatively affect crop yields (in some areas of field).

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pumpback System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Rating: Very High

Rating: High

Soil/Water Table Depth

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: F4

Overall Risk Rating: Very High

Leaching losses are likely contributing to soluble nutrient leaching below the root zone during most years. Nutrient management practices must be intense.

Percolation Rating: Very High

Deep Percolation (as % of Evapotranspiration): >40% Over ET

Comments: High potential for soluble nutrient leaching to occur. Nitrogen losses from denitrification will probably occur. Apply water according to crop requirements. Do not apply nitrogen prior to leaching events. Water logging and poor soil aeration may negatively affect crop yields (in some areas of field).

Nitrogen Application Rate

Comments: Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Rating: Very High

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pumpback System will help to reduce or

eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: F 5

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pumpback System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth

requirements are being adequately met.

Soil/Water Table Depth

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

Rating: High

Rating: Very Low or N.A.

Rating: Very High

Rating: High

FIELD: F 6

Overall Risk Rating: Very High

Leaching losses are likely contributing to soluble nutrient leaching below the root zone during most years. Nutrient management practices must be intense.

Percolation Rating: Very High

Deep Percolation (as % of Evapotranspiration): >40% Over ET

Comments: High potential for soluble nutrient leaching to occur. Nitrogen losses from denitrification will probably occur. Apply water according to crop requirements. Do not apply nitrogen prior to leaching events. Water logging and poor soil aeration may negatively affect crop yields (in some areas of field).

Nitrogen Application Rate

Comments: Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A. Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pumpback System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a

significant concern.

FIELD: F 7

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth

Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: F 8

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If

irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very High

Comments: No Data

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F9

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation

Rating:

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: No Data

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: No Data

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth

Rating: High

Comments: No Data

FIELD: Pasture 2

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Rating: Very Low or N.A. Percolation

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A. Comments: Some potential for nitrogen leaching if excess water is applied from

irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pumpback System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

NUTRIENT RISK ANALYSIS Legend

BMP	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.

Conservation Cover

This practice involves establishing and maintaining a protective cover of perennial vegetation on land retired from agriculture production.

Conservation Cropping
Sequence

Growing crops in a recurring sequence on the same field.

This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or enhances wildlife habitat.

This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.

Contour Farming

Farming sloping lands in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)

To reduce erosion and control water.

Cover and Green Manure Crop

A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.

To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.

Critical Area Planting

Planting vegetation on critically eroding areas that require extraordinary treatment.

This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated Dike or Berm

An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.

improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.

cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams,

construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe

gullies requiring specialized planting techniques and

Dikes are used to: Permit

management.

dikes, levees, and other

Diversion

A channel constructed across the slope with a supporting ridge on the lower side.

To divert excess water from one area for use or safe disposal in other areas.

Drip Irrigation

A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, and perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.

To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.

Filter Strip

A strip or area of vegetation for removing pollutants water.

A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and

other pollutants from runoff an waste water.

Fish Stream Improvement

Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.

The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.

Grade Stabilization Construction

A structure used to control the grade and head cutting in natural or artificial channels.

These structures are to: Stabilize the grade and control erosion in natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.

Grassed Waterway

A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff. Grassed waterways convey run from terraces, diversions, or on water concentrations without causing erosion or flooding and to improve water quality.

Grazing Land Mechanical Treatment

Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling. This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.

Heavy Use Area Protection Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials,

To stabilize urban, recreation, or facility areas frequently and intensely used by people, animas,

or by installing needed structures.

or vehicles.

Irrigation Land Leveling

Reshaping the surface of land to be irrigated to planned grades.

To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.

Irrigation Water Management Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.

Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion; Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.

Mulching

Applying plant residues or other suitable materials not produced on the site to the soil surface.

To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.

Polyacrylamide (PAM)

Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.

Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.

Prescribed Grazing

Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a

Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to:
1) Improve water infiltration, 2)

specific objective.

maintain or improve riparian ar upland area vegetation, 3) protestream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.

Residue Management (Conservation Tillage)

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.

This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.

Riparian Forest Buffer

A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.

The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.

Sediment Basin

A basin constructed to collect and store debris or sediment.

A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable

deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

Sprinkler System

A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure. To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.

Stream Channel Stabilization

Stabilizing the channel of a stream with suitable structures.

To control aggradation or degradation in a stream channel.

Stream bank Protection

Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.

To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.

Strip-cropping, Contour

Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or closegrowing crop is alternated with a strip of clean-tilled crop or fallow

To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants. or a strip of grass is alternated with a close-growing crop.

Strip-cropping, Field

Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.

To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.

Subsurface Drains

A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.

The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.

Surge Irrigation

Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.

Surge allows a lighter application of water with a higher effieciency. The result is less deep percolation of water at the upper end of the field and a more uniform application.

Tail water Recovery & Pumpback System

A facility to collect, store, and transport irrigation tail water for reuse in a farm irrigation distribution system. To conserve farm irrigation water supplies and water quality by collecting the water that runs off the field surface for reuse on the farm.

Terraces

An earth embankment, a channel, or a combination ridge and channel constructed across the slope.

Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain

runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.

Use Exclusion

Excluding animals, people or vehicles from an area.

To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.

Water and Sediment Control Basin An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form sediment trap and water detention basin.

To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.

Watering Facility

A device (tank, trough, or other watertight container) for providing animal access to water.

To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.

Wetland Development/Restoration The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland. To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Corn-Field Grain, Irrigated South ID NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area. Adequate N is necessary for maximum economic production of irrigated field corn used for silage or grain. Fertilizer N represents by far the largest share of the fertilizer costs for field corn in Idaho. The amount of N required depends on many factors that influence total corn production and quality. These factors include length of growing season, corn hybrid, previous crop, past fertilizer use, soil type, leaching hazard and previous manuring. Estimates of both the N available to corn during the season and the yield potential of the crop should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical field corn yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a good field corn yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by triticale for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in pre-plant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of field corn.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems. NITROGEN FROM MANURES - Soils in which field corn is grown occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to field corn. Additional N

Excessive irrigation by any method reduces N availability to field corn. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =

(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Coarse-textured soils, including sandy loams, loamy soils and sands, may lose N from leaching. For these soils, side dress a portion of the N at the time of the last cultivation. Sprinkler irrigation of corn under center pivots provides increased flexibility for providing N during the season. With sprinklers N can be injected into the system and applied with the water. On silt loam soils, split applications of N have not proven more effective as long as pre-plant N is adequately incorporated.

High N rates (approaching 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered.

High plant populations (above 28,000 to 30,000) and early plantings of longer season hybrids in the Treasure Valley will respond to high N rates provided there are no other limiting factors. High N rates will not compensate for reductions in stand or delayed plantings. High plant populations of field corn are more susceptible to N shortages because of greater competition among plants for limited N.

Side dressing may cause root pruning depending on plant size, distance of shank from the row and placement depth. High N rates (above 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered. On sandy textured soils subject to leaching, side dress a portion of the N at the time of the last cultivation. Under sprinkler irrigations, N can be injected through the lines throughout the season. On silt loam soils, split applications of N have not proven more effective as long as pre-plant N is adequately incorporated.

PHOSPHORUS

Adequate phosphorus (P) is necessary for maximum production of field corn. The soil test for P is based on samples collected from the first foot of soil. The soil is extracted with sodium bicarbonate.

Economic response to fertilizer P is more likely with cooler soil temperatures and soils with high lime content, particularly when planting long season hybrids. Phosphorus is an

immobile nutrient that does not move appreciably from where it is placed. It should be mixed into the seedbed or banded within easy reach of the seedling roots before or during the planting operation.

POTASSIUM

Field corn requires adequate potassium (K) for optimum growth. Soil test K can be useful in determining the need for K fertilizers. The soil sample is taken from the first foot of soil and extracted with sodium bicarbonate. Fertilizer K rates are based on soil test.

MICRONUTRIENTS

Zinc (Zn) deficiencies occur primarily on soils that are eroded, leveled or where the exposed subsoil is higher in lime. The DTPA test on soil samples collected from the first foot can be used for identifying Zn fertilizer needs. Apply 10 pounds of Zn per acre when the soil test measures less than 0.6 ppm.

Other micronutrients have not been shown to limit corn production. "Shotgun" applications of micronutrient mixtures containing boron (B), copper (Cu), iron (Fe) and manganese (Mn) "for insurance" have not been shown to be economical and are not recommended.

SULFUR (S)

The major corn-growing regions in Idaho should not experience shortages of S. Areas with S deficiencies include some irrigated areas where both the soil and irrigation water are low in S. Snake River water is known to have high S concentrations. Coarse-textured soils including sandy loams, loamy sands and sands would be more susceptible to S deficiencies than silt loam soils. Where the need for S is evident, use 30 pounds per acre of sulfate-sulfur (S04).

SALINITY (SALTS)

Field corn has a low to moderate tolerance to accumulated salts. Soils with total salt readings above 3 or 4 mmhos/cm can be cropped effectively. Readings up to 6 are also satisfactory although more careful water management may be required.

Pasture, Irrigated South ID - Good Condition Root Depth 4 feet

Lack of adequate fertilizer, improper irrigation management, poor stands, non-adapted plant species and poor grazing management are the major causes of low forage production in irrigated pastures. When properly managed, pastures will respond to fertilization and produce large quantities of high-quality forage and livestock products. Irrigated pastures are typically composed either of grass-legume mixtures or grasses alone. The composition of the pasture can be changed by fertilizer management and grazing method. Adapted and high-quality grasses for irrigated pastures include brome grass and orchard grass for well-drained soil, fescue and wheat grass for saline soils and creeping meadow foxtail and reed canary grass for wet soil. These grasses make excellent summer re-growth. Highest producing grass-legume mixtures usually include one or more of the above grasses with a well-adapted legume variety. An adapted legume variety should have good winter hardiness and resistance to insects and diseases.

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area. Grass pastures have responded well to nitrogen (N) fertilizer applications up to 150 pounds N per acre. The N rate depends upon the length of frost-free growing season and the number of cuttings or grazing periods. Production potential increases as the frost-free growing period is extended. Split applications of N fertilizer maintain a more uniform level of forage production through summer and fall. Broadcast 30 to 50 pounds N per acre per application after each cutting or grazing cycle, and irrigate to move N into the plant root zone. As the amount of legume increases in a grass/legume mixture, the need for N fertilizer decreases. When the legume composes over 60 percent of the mixture, responses from N are limited. Nitrogen applications will reduce the quantity of legume in a mixed species stand. Inoculation of legumes when the stand is established will reduce the need for N fertilization when legumes dominate the stand composition.

PHOSPHORUS

Intensively managed, high-producing pasture may respond to phosphorus (P) fertilization. Grasses generally have a low P requirement, and legumes generally have a high P requirement. Thus, P fertilizer applications tend to encourage legumes. Phosphorus movement in soils is limited, so P fertilizer needs to be placed in the rooting zone. Apply phosphorus during seedbed preparation whenever possible. Top-dress established pastures with P fertilizer, preferably in the fall.

POTASSIUM

Grasses have moderate potassium (K) requirements, and legumes have high K requirements. Idaho soils are usually high in natural K. Irrigation water contains K except in mountain streams. Potassium movement in soils is limited, though not to the same extent as that of phosphorus. Incorporate K during seedbed preparation or broadcast in the fall on established stands.

SULFUR

Sulfur (S) demand is greater for legumes than grasses. Sulfur requirements for grass and legumes will vary with soil texture, leaching losses, S soil test and S content of irrigation water. Apply 30 pounds of S to soil testing less than 10 ppm sulfate-sulfur (S04-S) in the plow layer. Areas irrigated with water from the Snake River and other streams fed by return flow should have adequate S. High rainfall areas, mountain valleys and foothill areas are likely areas for S deficiencies. Sulfur sources should be carefully selected due to variation in its availability to plants. Elemental sulfur must be converted so sulfate (S04) form by soil micro-organisms before it can be taken up by plants. Conversion of elemental S to S04 may take several months in warm moist soils. Elemental S fertilizers cannot supply adequate levels of S the year of application. However, these elemental S sources can supply considerable S the year after the initial application. Sulfate-sulfur sources are recommended to alleviate deficiencies the year of application.

Deficiencies of micronutrients such as zinc (Zn), copper (Cu), manganese (Mn) and iron (Fe) have not been observed on irrigated pastures in southern Idaho. Grasses and legumes are not sensitive to low levels of micronutrients as are row crops such as beans and corn. Boron (B) deficiencies may be observed on legumes in gravelly textured soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds of B per acre. Do not use higher rates because B is toxic to plants in excessive amounts.

GENERAL COMMENTS

Nitrogen and phosphorus are the elements needed most on Idaho irrigated pastures. Potassium, sulfur, zinc and boron may be needed. Their need is best determined by soil and plant tissue tests.

Legume population in a grass-legume mixture is reduced by nitrogen fertilization and increased by phosphorus and potassium addition when these nutrients are low in the soil.

Forage from properly fertilized grass or mixed grass-legume pastures has higher protein, providing higher quality livestock feed than unfertilized pastures.

Irrigated pastures make good use of sloping land, stony soils and shallow soils which are less desirable for row crops. Pastures reduce soil erosion during irrigation on sloping land.

Fertilizers are only one part of pasture management. Pastures are most profitable when plant selection, irrigation and harvest techniques are not limiting production.

Rotational grazing will provide more forage and greater returns than continuous grazing.

Contact your County Extension Agent if you have any questions regarding the interpretation of this information or for further information on your local needs.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to

influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldsman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize

nutrient use for crop production while protecting water quality:

- 1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.
- 2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.
- 3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

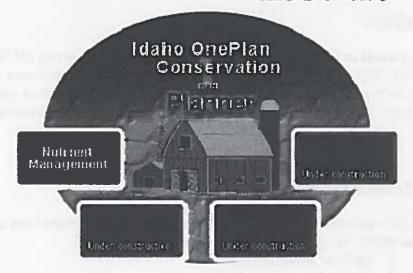
Field: No Data Date of Test: No Data

Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
E <i>C</i>	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
Р	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	
Мд	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

3

Grandview Farm 2 Section A Nutrient Management Plan

Agriculture . . . Launching into the Future



Nutrient Management Plan Prepared For:

Grandview Farms (208) 834-2231 Farm 2 Section A

Certified Planner:

Michael Mitchell Professional Engineer, EAC Engineering, Inc (559) 381-0607

Producer Signature:	Certificated Planner Signature:	- 3
	Date Completed: 10-02-07	

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27.17D6)

FARM 2 SECTION A Producer Summary

Farm Summary

Farm 2 Section A is located 10 miles Southwest of Mountain Home, AFB. The farm is owned by Grandview Farms and operated by Mike Usabel. The farm consists of three pivot irrigated fields, and one hand line irrigated field for a total of 468.5 acres available for accepting imported nutrients. Nutrients are imported from Simplot Feedlot.

Farm Resource Concerns

Farm 2 Section A is located in the watershed Basin of the CJ Strike Reservoir (#17050101). Facility is located at 115W 59'25" 42N 55'25" using GPS coordinates. The primary resource concern for Farm 2 Section A is ground water quality. No canals, laterals or ditches with irrigation water are near the fields to cause any type of runoff. Solid waste is applied to all of the fields and incorporated within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

- 1. Fertilizer application rates
- 2. Manure/Compost application rates
- 3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
- 4. Fields to which the nutrients are applied
- 5. Spring soil test for nitrogen (required annually) 0-12" and 12-24" nitrogen test

Crop Nutrient Requirement						
Сгор	Pounds of P205 per acres					
Hay	86					
Sugarbeets	48					
Potatoes	756					

Manure/Compost field application requirement (tons)										
Acres X crop nutrient requirement ÷ manure p205 value* = Tons required										
Cuerrale	050(v	7F (40.05	No. of the last of					
Example Hay	Corn - 250(acres) 250	~	75 (crop requirement) 86** = 21500	+ 16.85 + 16.85* =	1276 tons					

^{*}based on manure test values for P205

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If

^{**}pounds of p205 required per acre

irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a preplant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Farm 2 Section A ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

- 1) assure proper containment of animal manure and process waste water
- 2) assess resource concerns which exist on the property
- 3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.
- 4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO,) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue). Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1): Grandview Farms

Address: 1301 Hwy 67, Grandview, ID 83624

Phone: (208) 834-2231 N/A

N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation

District: Bruneau River

County: Owyhee

Watershed Basin: C. J. Strike Reservoir (USGS Hydrologic Unit Code #

17050101)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Farm 2 Section A is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW	HAB ALT	MET HG	мет		NUTR	0_0	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	1.
C J Strike Res	N/A	0	0	0	Ö	0	0	0	0	ı	0	0	1	0	0	0	0	0	0	х

Farm 2 Section A is <u>not</u> located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

<u>Priority 1</u> is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

<u>Priority 2</u> is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Farm 2 Section A is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

No Resource Concerns -

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
1 W	Cobbles	13
**	Fractured Bedrock	20
	Water Table	>72
2 W	Fractured Bedrock	20
	Water Table	>72
3 W	Cobbles	13
	Hard Pan	20
	Water Table	>72
4 W	Cobbles	13
	Fractured Bedrock	20
	Water Table	>72

Well Testing Results (See back of page):

	Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NHS	Na	Carbonate	Bicarbonate
3	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater

concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshehold Soil Test Depth
1 W	Groundwater < 5'	20	18 - 24"
2 W	Groundwater < 5'	20	18 - 24"
3 W	Groundwater < 5'	20	18 - 24"
4 W	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator
Coordinates of the farm center (meters): X = 2337663.98262943, Y = 1304000.08984006
Map Scale: 1:160

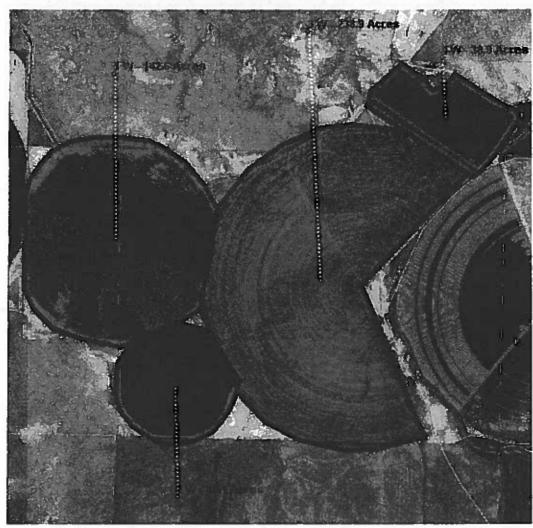


Figure 1. Base Map

Farm Location

 $\frac{\text{Idaho Transverse Mercator}}{\text{Coordinates of the farm center (meters): } X = 2337663.98262943, Y = 1304000.08984006$ Map Scale: 1:160

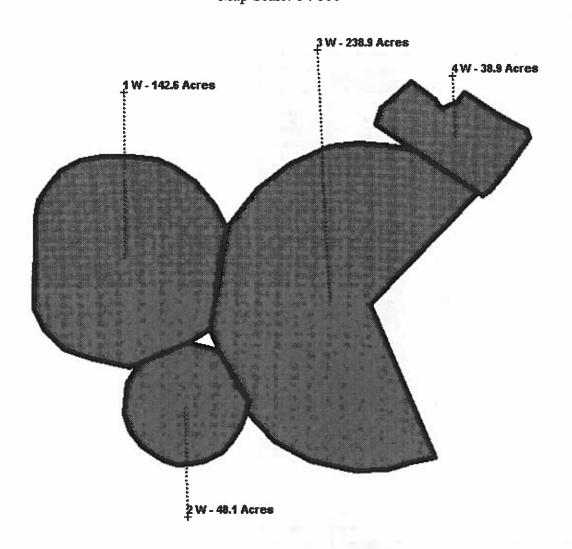


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

Assisted Mode has been turned off.

FIELD: 1 W

Name	Man App		Imported Nutrient	Miner	Mineralization		
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	58	N	0	N	58
		P	83	V. S		P	83
	1/	ĸ	320			K	320
			5 Trac				
Potatoes(2005)	Y	N	58	N	97	N	155
		P	B3			P	83
	- 3	ĸ	320			K	320
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)			5 Tipo				
	Y	N	58	N	32	N	90
	1	P	83			P	83
		K	320	183	100	K	320
	89		5 Truc				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	58	N	32	N	90
	1 8	P	B3			P	83
10.00		K	320			ĸ	320
			5°T/ac				
Affalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y	N	58	N	32	N	90
wate nay, impated South th-Cut Mid Bloom(2008)		P	83		Eas	P	83
77/0.2		K	320		1	ĸ	320

FIELD: 2 W

Name	Man App	1	Imported Nutrient	Miner	alization	T	otal
X-102			'S Triac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	58	N	0	Z	58
		P	83			P	83
v.s		K	320	6.		ĸ	320
V.			5 Tipo				
Potatoes(2005)	Y	Z	58	N	97	Z	155
	1	P	83			P	83
		ĸ	320			N P K	320
			5 Trác				
Potatoes(2005) faifa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	58	N	32	Ν	90
		P	83			P	83
	3	K	320		作 書	ĸ	320
			Silian				33
Alfalfa Hav Irripated South ID-Cut Mid Bloom(2007)	Y	N	58	N	32	N	90
Potatoes(2005) Ifalfa Hay, Irrigated South ID-Cut Mid Bloom(2006) Ifalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	1	P	83			P	83
		K	320		and the	ĸ	320

		I	5 T/sc			T	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y	N	58	N	32	N	90
,,		P	83			P	83
		K	320			ĸ	320

FIELD: 3 W

Name	Man App	ı	Imported Nutrient	Mines	alization	Т	ota
		Ī	5 Thic				
Potatoes(2004)		N	54	N	0	N	54
10000000	Y	P	78			P	71
(1)(x—50)(6)(3)—(5)(4)		ĸ	299			ĸ	29
		Ц	5.Tha				
Sugarbeets(2005)	Y	M	54	N	30	N	84
_		ď	78			P	71
		ĸ	299			ĸ	29
		Ц	5 Thic				3
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom (2006)	Y	N	54	N	30	N	84
		P	78		15-30	P	71
		K	299			ĸ	29
			5 T/ac			П	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	54	N	30	N	84
,		P	78			P	78
		ĸ	299			K	29
			5 TVac			П	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y	N	54	N	30	N	84
	l i	P	78			P	78
		ĸ	299			ĸ	29
			5 Trac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y	N	54	N	30	N	84
,,,		P	78			P	78
		K	299			κ	29
			5.T/sč		1900		
Potatoes(2010)	Y	Z	54	N	30	N	84
		P	78			P	78
		K	299		1	ĸ	29

FIELD: 4 W

Name	Name Man App		Imported Nutrient	Miner	alization	T	otal
Potatoes(2004)			5/I/ac				
	Y	N	57	N	0	N	57
		P	82		37.5	P	82
		K	316			ĸ	316
			5 T/ac			П	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	57	N	32	Z	89
Allen tay, angues some a contraction,	·	P	82	935		P	82
	armente.	K	316			K	316
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac			П	

V		N	57	N	32	N 89
		P	82			P 82
		К	316			K 31
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)			5 T/ac			
	Y	N	57	N	32	N 89
		P	82			P 82
		к	316			K 31
0 - 374 - 4,572,999 - 0 0			51/ac			
Potatoes(2008)	Y	N	57	N	32	N 89
	•	P	82		No.	P 82
		к	316		7	K 31

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	419

The acreage in the table is based on an average crop uptake of 100 lbs P₂O₅ per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Division of Animal Industries.

Hydraulic Balance

Field	Date
1 W	May 1
2 W	May 1
3 W	April 15
4 W	April 1

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test

Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: 1 W Crop: Potatoes Yield: 550

	N	P205	K20
Crop Nutrient Requirement	330	76	343
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	65		
from Prior Bio-Nutrients	32		193
from Irrigation Water	0		0
Nutrient Balance from above	234	75.6	343.2
Imported Nutrients	58	83	320
Estimated Remaining Nutrients Required	176	-7	23
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	176	-7	23

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: 2 W Crop: Potatoes Yield: 550

N	P205	K20
330	76	343
?		248
0		
65		
32		
0		0
234	75.6	343.2
58	83	320
176	-7	23
0	0	0
176	-7	23
	330 ? 0 65 32 0 234 58 1176	0 65 32 0 234 75.6 58 83 176 -7 0 0

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: 3 W Crop: Sugarbeets Yield: 35

	N	P205	K20
Crop Nutrient Requirement	290	48	118
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		

from Prior Bio-Nutrients	30		XXIII.
from Irrigation Water	0		0
Nutrient Balance from above	261.1	48.1	117.6
Imported Nutrients	54	78	299
Estimated Remaining Nutrients Required	207	-30	-181
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	207	-30	-181

Acceptable: Sustainable agronomic rate.

Field: 4 W Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	32		
from Irrigation Water	0		0
Nutrient Balance from above	333.8	85.9	351
Imported Nutrients	57	82	316
Estimated Remaining Nutrients Required	277	4	35
Commercial Fertilizer Application	0	Q	0
Final Nutrient Balance	277	4	35

Acceptable: Sustainable agronomic rate.

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary								
Bio-Nutrient Group Name	Amount	Consumer	Consumer's Address	Telephone	Acres			
No Data	No Data	No Data	No Data	No Data	No Data			

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: 1 W

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Rating: Very Low or N.A.

Rating: Very High

Rating: Medium

Rating: High

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 83.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Comments: No Data

Rating: Very Low or N.A.

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this

field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: 2 W

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 83.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this

field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: 3 W

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is

successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 77.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Rating: Medium

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: 4 W

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 82.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations).

A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Surface Irrigation or Overhead Irrigation

Comments: No Data

Runoff Best Management Practices

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this

field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: 1 W

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Rating: Medium

Rating: Very High

Rating: High

Rating: Low

Rating: Very Low or N.A.

Rating: Very Low or N.A.

Rating: Very High

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: 2 W

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency
Comments: No Data

Rating: Very Low or N.A.

Soil/Water Table Depth

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

Rating: Medium

FIELD: 3 W

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A. Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and

appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth

needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Rating: Medium

Comments: No Data

Soil/Water Table Depth

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface

transport to ground water and interconnected surface water may be a concern.

FIELD: 4 W

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Rating: Very Low or N.A. Percolation

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Medium

Comments: Check and maintain system for leaky joints and worn-out pumps, sprinklers or nozzles. Use flow controllers to improve efficiency. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

NUTRIENT RISK ANALYSIS Legend

ВМР	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover of perennial vegetation on land	This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or

retired from agriculture production.

enhances wildlife habitat.

Conservation Cropping Sequence

Growing crops in a recurring sequence on the same field.

This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.

Contour Farming

Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)

To reduce erosion and control water.

Cover and Green Manure Crop

A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.

To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.

Critical Area Planting

Planting vegetation on critically eroding areas that require extraordinary treatment.

This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized

planting techniques and management.

Dike or Berm

An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.

Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.

Diversion

A channel constructed across the slope with a supporting ridge on the lower side.

To divert excess water from one area for use or safe disposal in other areas.

Drip Irrigation

A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.

To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.

Filter Strip

A strip or area of vegetation for removing pollutants water.

A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.

Fish Stream Improvement

Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.

The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.

Grade Stabilization Construction

A structure used to control the grade and head cutting in natural or artificial channels.

These structures are to: Stabilize the grade and control erosion in natural or artificial channels,

prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.

Grassed Waterway

A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.

Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.

Grazing Land Mechanical Treatment

Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.

This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.

Heavy Use Area Protection Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures. To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.

Irrigation Land Leveling

Reshaping the surface of land to be irrigated to planned grades.

To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.

Irrigation Water Management Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.

Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion; Decrease non-point source

pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.

Mulching

Applying plant residues or other suitable materials not produced on the site to the soil surface.

To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.

Polyacrylamide (PAM)

Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.

Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.

Prescribed Grazing

Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.

Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to:
1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.

Residue Management (Conservation Tillage)

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.

This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.

Riparian Forest Buffer

A riparian forest buffer is an area of trees and/or shrubs located

The riparian forest buffer is a multi-purpose practice design to

adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.

accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.

Sediment Basin

A basin constructed to collect and store debris or sediment.

A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

Sprinkler System

A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.

To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.

Stream Channel Stabilization

Stabilizing the channel of a stream with suitable structures.

To control aggradation or degradation in a stream channel.

Stream bank Protection

Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion. To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander that would adversely affect

downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.

Strip-cropping, Contour

Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or closegrowing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.

To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.

Strip-cropping, Field

Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.

To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.

Subsurface Drains

A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.

The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.

Surge Irrigation

Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.

Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the field and a more uniform application.

Tail water Recovery & Pumpback System

A facility to collect, store, and transport irrigation tail water for reuse in a farm irrigation To conserve farm irrigation water supplies and water quality by collecting the water that runs off distribution system.

the field surface for reuse on the farm.

Terraces

An earth embankment, a channel, or a combination ridge and channel constructed across the slope.

Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.

Use Exclusion

Excluding animals, people or vehicles from an area.

To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.

Water and Sediment Control Basin An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.

To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.

Watering Facility

A device (tank, trough, or other watertight container) for providing animal access to water.

To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.

Wetland
Development/Restoration

The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland. To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S. Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculated the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0-to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct a S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes, and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops would have sufficient residual for alfalfa.

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do not use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the re-growth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition.

Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however.

Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage.

Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

Potatoes NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Most Idaho potato fields will respond to fertilizer nitrogen (N). The N rate used, along with other management factors, particularly irrigation, can have a marked effect on the yield and quality of the potato crop.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical potato yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward.

Research has shown that the available N required to produce a good potato yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by potatoes for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates. MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in pre-plant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be

determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugarbeets, onions) generally do not require additional N for decomposition.

Consequently, these residues have little effect on the N needs of potatoes.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which potatoes are grown rarely receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to potatoes. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system. Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) -

(previous crop/residue management) - (Manure Nitrogen) -(Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizer recommendations are for Russet Burbank potatoes grown on sandy loam soils.

Adjustments are made for very sandy soils (add 30 lb N/acre) and silt loam soils (subtract 40 lb N/acre) to account for differences in nitrogen mineralization rates and nitrogen use efficiency. To maximize yield and quality, growers should aim to have about 40 to 45% of their total N supply applied by row closure. Nitrogen applications made during tuber bulking should be guided by petiole sampling to maintain at least 15,000 ppm N03-N in the fourth petiole from the growing tip.

Excess levels of soil N at or before tuberization can delay tuber growth, reduce yields and lower tuber specific gravity. Excess N in late summer and fall can delay maturity of the tubers. This delayed tuber maturity can adversely affect tuber storability and quality.

The N needs of the potato crop are best met by split-application of N fertilizer. This involves applying lower rates of N fertilizer pre-plant and at planting, with the remainder of the crop's N needs applied with the irrigation water. Some cropping systems - for example, furrow irrigation - make it difficult to apply N fertilizer and get efficient plant uptake. Under these conditions most of the crop N needs are applied to the soil before planting.

Nitrogen applied with irrigation water is an effective way to supplement the crop during the growing season. Do not use aqua or anhydrous ammonia in sprinkler system applications. Applications through a sprinkler system are not folar fertilization.

PHOSPHORUS

Potato plants need phosphorus (P) for plant growth and will respond to P fertilizer if the soil test concentration is low. Phosphorus soil test for potatoes is based on an extraction with sodium bicarbonate. Soil samples for a phosphorus soil test should be taken from 0- to 12-inch depths. This depth of sampling is critical to achieve an accurate soil test P level. Deviation in sampling depth from the 12-inch depth may drastically alter soil test results.

Phosphorus is immobile in soil and therefore does not move from where it is placed. Applied P fertilizer must be mixed into the seedbed before planting for best results. Banding P fertilizer along side plants has not been as effective as P fertilizer that has been broadcast and incorporated. Eroded or scraped areas, commonly referred to as "white soil" areas, may be low in available P because of its high content of "free lime." These areas should be tested and fertilized separately. To compensate for low P availability when free lime is present in the soil, rates of P are increased with increasing levels of free lime. Total phosphorus concentrations should be kept above 0.22% in the fourth petiole during tuber bulking.

POTASSIUM

Potatoes require high levels of available potassium (K). Potassium is relatively immobile in the soil. For best results, K fertilizers should be applied pre-plant and mixed into the seedbed. Banding beside the plants has been used successfully but is not as effective as K fertilizer which has been broadcast and incorporated. Potassium fertilizer applications reduce specific gravity of harvested tubers. Potassium chloride fertilizer (KCl or muriate of potash) lowers specific gravity of tubers more than potassium sulfate fertilizer (K2SO4 or sulfate of potash). Growers should avoid over-fertilization of potatoes with K fertilizers. When specific gravity of tubers is important, potassium sulfate is the preferred K fertilizer source. Total potassium concentrations should be kept above 7.0% in the fourth petiole during tuber bulking.

SULFUR

Potatoes generally do not respond to sulfur (S) fertilization. Sulfur response is most likely to occur in sandy soils and in areas where irrigation water sources are low in S. Water low in S includes mountain streams an some well waters. The more irrigation return-flow in the water source the greater the amount of dissolved, plant-available sulfate (S04) form. Elemental sulfur is not recommended because it is not immediately available to plants. Elemental sulfur will require several months from time of application until it is converted to plant-available form.

MICRONUTRIENTS

"Shotgun" application of micronutrients - I.e. complete mixes containing boron (B), copper (Cu), iron (Fe), manganese (Mn) and zinc (Zn) - "for insurance" are not recommended since these elements have not been shown to give an economical response. Soil tests for individual micronutrients are available and concentrations in the 0- to 1-inch soil sample are: B = 0.5 ppm, Cu = 0.2 ppm, Fe = 4.0 ppm, Mn = 2.0 ppm, Zn = 0.5 ppm. Critical concentrations represent values below which a response from the application of that micronutrient may be obtained.

Zinc deficiencies have not been widespread on potatoes although some crops in certain areas of southern Idaho do show a Zn deficiency. When the soil test for Zn is below the critical concentration or where land leveling or erosion has exposed white subsoil containing free lime, apply Zn fertilizer at a rate which will supply 10 pounds of Zn per acre or equivalent. This amount of Zn should be sufficient for 4 to 6 years of crop production.

GENERAL COMMENTS

The P, K, and Zn nutritional status of the plant should also be monitored during the growing season. The same petiole sample used for N03-N concentrations can also be used for this purpose. Guidelines for adequate concentrations of these and other nutrients in the petiole can be obtained from your county agricultural Extension agent, consultant, or fieldman.

Fertilizer materials containing P, K and Zn should be thoroughly incorporated into the root zone. These materials can be effectively applied in the fall.

Sugarbeets NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Controlling the amount of N available to the sugarbeet is critical in producing high beet tonnage with high sugar percentage. Nitrogen in excess can reduce sugar percentage and gross income per acre.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical sugarbeet yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates. MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. Soils that retain moisture tend to mineralize more N than soils such as sandy loams, which dry out more rapidly. Mineralization of N is limited by cooler soil temperatures that limit soil biological activity.

While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized. INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Accurate soil sampling and analysis in a high value crop like sugarbeets is one of the best investments that can be made and is highly recommended. A soil test measures the residual N carryover from the previous crop and provides the necessary information for accurate fertilizer application. Nitrate nitrogen

(NO3-N) is mobile in the soil. Soil samples, therefore, should be taken from the 0- to 12-inch and 12- to 24-inch soil depths or the effective root zone. These depths should be sampled and kept separate for analysis. If the first foot is low in N (less than 5 ppm) but the sum of the first 2 feet is adequate, 20 to 40 pounds of N per acre may be applied to provide N until root growth is sufficient to reach the N in the second foot (about to 5 weeks after emergence).

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Non-cereal residues (potatoes, sugarbeets, onions, beans, mint, and sweet corn) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of sugarbeets. Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Very few soils used for sugarbeets receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most district are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to sugarbeets. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system. Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =

(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test)
(previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizers can be fall applied on loam, silt loam, and clay soils. Winter leaching of N from the soil profile can be reduced to a minimum by applying N in the ammonium or urea forms when soil temperature is below 45 F. Greater efficiency may be obtained from pre-plant application in spring or by side dressing before July 1. Nitrogen applied after July 1 stimulates vegetative growth, lowers sugar percentage and extractability and contributes little to total sugar yield.

On sandy soils where over-irrigation and leaching of nitrogen are likely, side dressing or applications of nitrogen through irrigation water before July 1 are suggested for at least half of the rate used. Split N applications often increase nitrogen use efficiency, sugarbeet tonnage, and sugar production. Research conducted at the Kimberly R & E Center during 1992-1994 showed that split N fertilization generally increased estimated recoverable sugar and net economic return/acre compared to applying all N pre-plant. However, growers need to avoid applying significant amounts of N late in the growing season, which can stimulate top growth at the expense of sugar production.

The practice of placing starter fertilizer with the seed is not recommended because it will reduce germination and result in poor stands.

PHOSPHORUS

Sugarbeets will respond to P fertilizer if soil test levels are low. The soil test is based on extractable P present in the upper 12 inches of the soil.

Phosphorus should be plowed down or applied to rough-plowed ground and worked into the seedbed. High rates should not be placed with or immediately below the seed. Side dressing is recommended when late applications are necessary.

POTASSIUM

Sugarbeets require less K than potatoes or alfalfa but will respond to K fertilization if soil test levels are low. The soil test is based on the extractable K present in the upper 12 inches of the soil. Potassium should be incorporated into the seedbed.

MICRONUTRIENTS

Deficiencies of Zn are not widespread in sugarbeets. When the soil test for Zn is below 0.6 ppm in the upper 12 inches of the soil, or where land leveling has exposed white, limey subsoil, apply Zn fertilizer at a rate that supplies 10 pounds of zinc per acre or equivalent.

"Shotgun" applications of micronutrient mixtures "for insurance" have not been necessary or economical; therefore, they are not recommended.

SULFUR

Sulfur is generally not deficient in the major sugarbeet-growing region of Idaho where the Snake River is the source of irrigation water. In areas known to be S deficient or where the soil test is less than 8 ppm in the 0-to 12-inch soil sample, apply 30 pounds S per acre.

GENERAL COMMENTS

Uniform plant populations (110 to 130 plants per 100 feet of row) after thinning have produced the highest root yields and sugar percentages.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:
 - 1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.
 - 2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.

3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

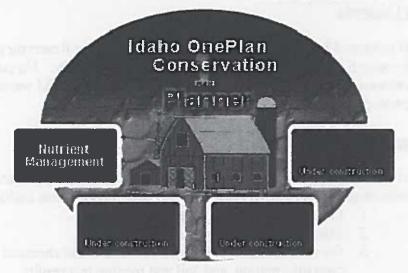
Appendix D: SOIL TEST DATA

Field: No Data Date of Test: No Data

Field: No Data	Date of	of lest:	No Data	
Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meg	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
Р	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	_ppm	No Data	No Data	
Си	ppm	No Data	No Data	
Са	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

Grandview Farm 2 Section B Nutrient Management Plan

Agriculture . . . Launching into the Future



Nutrient Management Plan Prepared For:

Grandview Farms (208) 834-2231 Farm 2 Section B

Certified Planner:

Michael Mitchell
Professional Engineer, EAC Engineering, Inc
(559) 381-0607

Producer Signature:	Certificated Planner Signature:
	Date Completed: 10-02-07

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27 17D6)

FARM 2 SECTION B Producer Summary

Farm Summary

Farm 2 Section B is located 9 miles southwest of Mountain Home, AFB, Idaho at 115W 57'35" 42N 55'25". The farm is owned by Grandview Farms and operated by Mike Usabel. The farm consists of five pivot irrigated fields, and six hand line irrigated field for a total of 988.2 acres available for accepting imported nutrients. Nutrients are imported from Simplot Feedlot. Primary crops produced include, Alfalfa, Potatoes, Sugar beets and Corn on a five year rotation.

Farm Resource Concerns

Farm 2 Section B is located in the Watershed Basin of the CJ Strike Reservoir (#17050101). The primary resource concern for Farm 2 Section B is ground water quality. No canals, laterals or ditches with irrigation water are near the fields to cause any type of runoff. Solid waste is applied to all of the fields and incorporated within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

- 1. Fertilizer application rates
- 2. Manure/Compost application rates
- 3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
- 4. Fields to which the nutrients are applied
- 5. Spring soil test for nitrogen (required annually) 0-12" and 12-24" nitrogen test

Crop Nutrient Requirement								
Crop	Pounds of P205 per acres							
Hay	86							
Sugar beets	48							
Corn	75							
Potatoes	76							

Manure/0	Compost field applic	atio	n requirement (tons)										
<u>Acres</u> X <u>crop nutrient requirement</u> ÷ <u>manure</u> p205 value* = Tons required													
	MINISTRAL PROPERTY AND ADDRESS OF THE PARTY AN	100.00		0.000									
Example Corn - 250(acres) X 75 (crop requirement) \div 16.85 Hay 250 X 86** = 21500 \div 16.85* = 1276 tons													

^{*}based on manure test values for P205

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If

^{**}pounds of p205 required per acre

Irrigation water is under-applied; the crop will not have optimal growth conditions. Crop Irrigation water requirements changes through the growing season depending on climate Conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

Irrigation schedules continue to be managed by your irrigation specialist.

 Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will
 prevent fertilizer leaching through the soil profile and provide the crop with the necessary
 levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Farm 2 Section B ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

- 1) Assure proper containment of animal manure and process waste water
- 2) Assess resource concerns which exist on the property

- 3) Budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.
- 4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO,) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue). Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquationife.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION Owner Information

Owner (1): Grandview Farms

Address: 1301 Hwy 67, Grandview, ID 83624

Phone: (208) 834-2231 N/A

N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation

Bruneau River

District: County:

Owyhee

Watershed Basin:

C. J. Strike Reservoir (USGS Hydrologic Unit Code # 17050101)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Farm 2 Section B is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES		CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	•
C J Strike Res	N/A	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	X

Farm 2 Section B is <u>not</u> located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

<u>Priority 1</u> is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

<u>Priority 2</u> is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Farm 2 Section B is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

• No Resource Concerns -

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
1 E	Cobbles	13
	Hard Pan	20
	Water Table	>72
2 E	Cobbles	13
	Fractured Bedrock	20
	Water Table	>72
3 E	Cobbles	13
	Hard Pan	20
	Water Table	>72
4 E	Cobbles	13

	Water Table	>72
5 E	Cobbles	13
	Water Table	>72
5 W	Cobbles	13
	Water Table	>72
6 E	Cobbles	13
	Water Table	>72
6 W	Cobbles	12
	Fractured Bedrock	20
	Water Table	18
7 E	Cobbles	13
	Water Table	>72
8 E	Cobbles	13
	Water Table	>72
Gainza	Cobbles	13
	Water Table	>72

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No	No	No Doto	No	No	No	No	No	No	No Doto	No Doto	No Data
Data	Data	INO Data	Data	Data	Data	Data	Data	Data	INO Data	INO Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshehold Soil Test Depth
1 E	Groundwater < 5'	20	18 - 24"
2 E	Groundwater < 5'	20	18 - 24"
3 E	Groundwater < 5'	20	18 - 24"
4 E	Groundwater < 5'	20	18 - 24"
5 E	Groundwater < 5'	20	18 - 24"
5 W	Groundwater < 5'	20	18 - 24"
6 E	Groundwater < 5'	20	18 - 24"
6 W	Groundwater < 5'	20	18 - 24"
7 E	Groundwater < 5'	20	18 - 24"
8 E	Groundwater < 5'	20	18 - 24"
Gainza	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator
Coordinates of the farm center (meters): X = 2339658.40239254, Y = 1304230.81004121 Map Scale: 1: 213



Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2339658.40239254, Y = 1304230.81004121 Map Scale: 1: 213

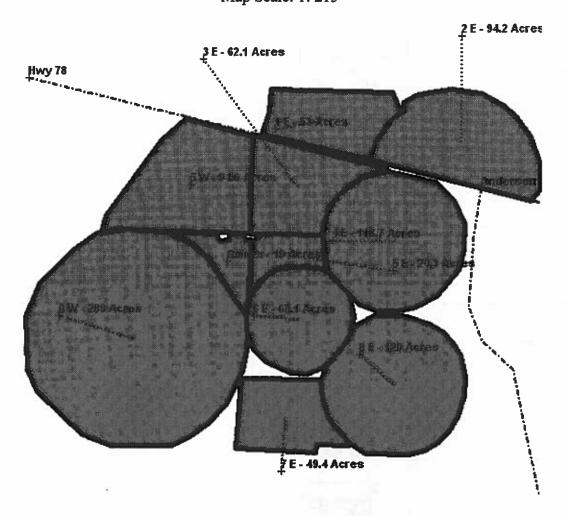


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: 1 E

Name	Man App		Minera	lization	To	t a
		L			L	
Potatoes(2004)	Y	N	N	0	И	G
	1500	₽			P	q
		K			K	4
		7	N	-	N	í
Mfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	P			P	d
		K			K	H
					9	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006	Y	N	N	0	N	4
		P			P	Ľ
		K.	1000		K	۱
Malfalfa Hav Irrigated South III-Out Mid Bloom/2007)	Y	N	N	0	N	ļ
fa Hay, Irrigated South ID-Cut Mid Bloom(2007	•	Р			P	c
		ĸ	1/1		K	(
100		й	N	0	Z	(
dfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y	P	15.50	1200	P	d
		K			K	0
2000		N	N	0	N	0
Potatoes(2009)	Y	P	No.	3000	P	c
Potatoes(2009)		K	2955		K	0

FIELD: 2 E

Name	Man App		Imported Nutrient	Miner	alizatios	T	otal
			4 The			Ţ	
Corn-Field Grain, Irrigated South ID(2004)	Y	N	52	N	0	N	52
	`	P	75	BO	機	P	75
		ĸ	290			K	290
			4/T/ac				
Corn-Field Grain, Irrigated South ID(2005	Y	N	52	N	-6	N	46
	,	P	75			P	75
		K	290			K	290
Corn-Field Grain, Irrigated South ID(2006)	Y		4 Dac			Ι	Γ
		N	52	N	-6	Z	46
		P	75	RO!	1983	P	75

		к	290		361	K	290
Corn-Field Grain, Irrigated South ID(2007)			4°E/ac			Τ	Γ
	Y	N	52	N	29	N	81
	-	P 75	75		2	P	75
		ĸ	290		PAR S	K	290
Potatoes(2008)	-	2000	4 T/ac			П	
	Y	N	52	N	29	N	81
		Р	75	48		P	75
		к	290		SEE.	ĸ	290
Corn-Field Grain, Irrigated South ID(2009)		200	417ac			П	
	Y	N	52	N	29	N	\$1
	·	P	75		75	P	75
		К	290		10 (3)	к	290

FIELD: 3 E

Name	Мал Арр		Mineral	ization	To	tal
					Ŀ	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	N	0	N	0
		P			P	0
		ĸ			K	0
		N	N	0	N	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	P		No.	P	0
		ĸ	THE STATE OF		Ŀ	H
27	_	Second	1000	K	۲	
Potatoes(2006)	Y	Z	N	0	N	0
	'	P	Bud.		P	0
		K			K	0
						L
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	N	0	N	H
		P			P	Н
		K			K	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y	Z	N	0	N	0
Antana riay, migasee South to-Cut wild bloom(2008)	•	P			P	0
		K			ĸ	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)						
	Y	N	N	0	N	0
		P	4		P	0
		K			K	0

FIELD: 4 E

Name	Мап Арр		Minerali	ization	То	tal
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	Γ			Γ	
		N	N	0	N	0
		P			P	0

		к			ĸ	0
		N	N	0	N	Q
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	P	2005		P	0
		K		1000	K	₽
	Y	N	N	0	N	0
Potatoes(2006)	¥	P	14%		P	0
		к			ĸ	0
falfa Hay, Irrigated South ID-Cut Mid Bloom(2007) Y		N	N	0	N	0
	Y	P	100	200	P	0
		к	0		ĸ	0
	Y	N	N	0	N	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	ĭ	P	3		P	0
		к			ĸ	0
Malfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	v	Z	N	0	N	0
	Y	P	200		P	0
		к			K	0

FIELD: 5 E

Name	Мап Арр	L	Miner	alization	T.	m
		2	N	0	N	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	2		STATE OF	ŀ	ō
		K			K	F
			,			
Potatoes(2005)	Y	Z	N	65	N	H
		P			P	0
= =		K			K	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006) Y	v	Z	N	0	N	0
	•	P	E	58	P	q
		K			К	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	N	0	N	0
,,		P		2024	P	0
,		к			K	0
	¥	Z	N	0	N	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	¥	P		J. Sept.	P	0
		K			К	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	v	Z	N	0	N	0
	Y	P	100	No.	P	0
		K	ROS .		ĸ	0

FIELD: 5 W

Name	Мал Арр		Mineral	ization	To	tel
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	N	0	N	0
and and an arrangement of the second		P			P K	⊦
			20114 4 2000	Service of the servic		
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	Z	N	0	N P	۲
		K			ĸ	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006) Y	Y	z	N	0	N	۰
		P			P K	0
		N	N	0	Z	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	P			P	0
		K			K	0
Potatoes(2008)	Y	N	N	0	N	0
		P K			P K	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)		N P	N	0	N P	0
		ĸ			K	0

FIELD: 6 E

Name	Мап Арр		Miner	alization	To	XA
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	N	0	N	0
, , , , , , , , , , , , , , , , , , , ,	•	P	200		P	0
		ĸ			ĸ	0
Potatoes(2005) Y	.,	N	N	65	N	6:
	Y	P			P	0
		ĸ			K	0
A16-16 Van Industrial Small ID Con Mid Discour(2000)	Y	1 2	N	. 0	Z	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	P		u di ini	P	0
		κ			K	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	2	N	0	N	0
	1	P		A STATE	P	0
		K		190	ĸ	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y	Ĭ				Γ

		N	N	0	N	Ð
		P		医验	P	0
		ĸ			K	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y	N	N	0	N	ō
Attains May, Emgaled South ID-Cut Mild Dicotil(2009)	•	P	23	SIE.	P.	0
		ĸ	Ser.	100	ĸ	0

FIELD: 6 W

Name	Мап Арр		Imported Nutrients	Miner	alization	T	otal
3034			¶T/ac				Γ
Corn-Field Grain, Irrigated South ID(2004)	Y	Ν	52	N	0	N	52
		P	75			P	75
		K	290			K	29
100 100 100 100 100 100 100 100 100 100			4 The				
Corn-Field Grain, Irrigated South ID(2005)	Y	N	52	N	-6	N	46
		P	75		224	P	75
		K	290			K	29
Corn-Field Grain, Irrigated South ID(2006)			4 Tolac				
	V I	И	52	N	-6	Z	46
		P	75		3	P	75
		K	290		THE STATE OF	K	29
			4 Tyes				
Corn-Field Grain, Irrigated South ID(2007)	Y	N	52	N	29	N	81
,		P	75			P	75
		K	290			K	291
			47T/sc				
Potatoes(2008)	Y	N	52	N	29	N	81
* * *		P	75	2		P	75
		K	290			K	290
			417/ac				
Corn-Field Grain, Irrigated South ID(2009)	Y	N	52	N	29	N	81
		P	75		100	P	75
		K	. 290		1000	ĸ	29

FIELD: 7 E

Name	Мал Арр		Mineral	ization	То	(al
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	N	0	Ŋ	0
Chaire 121, Brigada Soul 25-Cat His Stocking Sovy		P K			P K	0
				Spinist.		
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	N	0	N	0
		P			P	0
		K	72		K	0
Potatoes(2006)	Y					

		N	N	0	N	6
		P	5 9	2	P	0
		к			к	0
					L	L
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N.	N	0	И	O
		P			P	0
		К			К	0
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y	И	N	0	N	0
,	-	Р	145		P	0
		К		靈	к	0
			N	_		Ĺ
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y	1	N	0	N	P
		P	1	200	₽	0
		к			ĸ	0

FIELD: 8 E

Name	Man App		Imported Nutrien	Miner	lizatio	ıΤ	otal
			4/T/ac				
Fallow(2004)	_Y	N	48	N	0	N	48
3	'	P	69	1	3231	P	69
		ĸ	264			ĸ	264
			4T/pc			Π	П
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	48	N	26	N	74
		P	69			P	69
		K	264	鑩		K	264
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)			4 Trac				
	Y	N	48	N	26	N	74
		P	69	100	200	P	69
		K	264			ĸ	264
			410/pp				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	48	N	26	N	74
			69			P	69
		k	264			ĸ	264
		1	4 Thic				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y	Z	48	N	26	N	74
,		Г	69			P	69
		K	264			K	264
	3		4 Dac				
Fallow(2009)	Y	Z	48	N	26	N	74
,,,		P	69			P	69
	. 3	K	264		和洞	ĸ	264

FIELD: Gainza

Name	Мап Арр	Imported Nutrients	Mineralization	Total
Fallow(2004)	Y	4.T/ac		П

1 (4)		N P	48	N	. 0	N	48
			69		N.	P	69
		к	264			K	26-
		100	4 Truc		esting?	П	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	48	N	26	N	74
756		P	69		10%	P	69
		К	264			К	26
			4/T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	48	N	26	N	74
		P	69			P	65
		K	264	W.		K	26
2 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10			4 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	48	N	26	N	74
		P	69			P	65
		K	264			K	26
			4 Tiac			П	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y	N	48	N	26	N	74
The state of the s		P	69			₽	65
		к	264		1	K	26
		15. 15.	4 T/ac				
Fallow(2009)	Y	N	48	N	26	N	74
(- ,		P	69			P	69
		к	264			K	26

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	1552

The acreage in the table is based on an average crop uptake of 100 lbs P₂O₅ per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Dairy Bureau (208) 332-8550.

Hvdraulic Balance

Hydrai	Hydraulic Balanc					
Field	Date					
1 E	April 15					
2 E	April 15					
3 E	May 1					
4 E	April 15					
5 E	April 1					
5 W	March 15					
6 E	April 15					
6 W	May 1					
7 E	April 15					

8 E	April 15
Gainza	April 15

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test

Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: 1 E Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		1000
from Mineralized Nitrogen	0		
from Prior Crops	0	123	
from Prior Bio-Nutrients	0		
from Irrigation Water	0		0
Nutrient Balance from above	365.5	85.9	351
N/A	N/A	N/A	N/A
Estimated Remaining Nutrient's Required	366	86	351
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	366	86	351

Field: 2E Crop: Corn-Field Grain, Irrigated South ID Yield: 210

	N	P205	K20
Crop Nutrient Requirement	300	75	56
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	29		
from Irrigation Water	0		0
Nutrient Balance from above	307	75.4	56.4
Imported Nutrients	52	75	290

Estimated Remaining Nutrients Require	d 255	0	-234
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	255	0	-234

Acceptable: Sustainable agronomic rate.

Field: 3 E Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0	3200	
from Prior Bio-Nutrients	0		
from Irrigation Water	0		0
Nutrient Balance from above	365.5	85.9	351
N/A	N/A	N/A	N/A
Estimated Remaining Nutrients Required	366	8 6	351
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	366	86	351

Acceptable: Sustainable agronomic rate.

Field: 4 E Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	0		
from Irrigation Water	0		0
Nutrient Balance from above	365.5	85.9	351
N/A	N/A	N/A	N/A
Estimated Remaining Nutrients Required	366	86	351
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	366	86	351

Field: 5 E Crop: Potatoes Yield: 550

	N	P205	K20
Crop Nutrient Requirement	330	76	343
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	65		
from Prior Bio-Nutrients	0		
from Irrigation Water	0		0
Nutrient Balance from above	260	75.6	343.2
N/A	N/A	N/A	N/A

Estimated Remaining Nutrients Required	266	76	343
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	266	76	343

Caution: Rate is either deficit or is approaching an amount that may potentially contribute to an environmental risk.

Acceptable: Sustainable agronomic rate.

Field: 5 W Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	0		
from Irrigation Water	0		0
Nutrient Balance from above	365.5	85.9	351
N/A	N/A	N/A	N/A
Estimated Remaining Nutrients Required	366	86	351
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	366	86	351

Acceptable: Sustainable agronomic rate.

Field: 6 E Crop: Potatoes Yield: 550

	N	P205	K20
Crop Nutrient Requirement	330	76	343
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	65		
from Prior Bio-Nutrients	0		
from Irrigation Water	0		0
Nutrient Balance from above	360	75.6	343.2
N/A	N/A	N/A	N/A
Estimated Remaining Nutrients Required	266	76	343
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	266	76	343

Caution: Rate is either deficit or is approaching an amount that may potentially contribute to an environmental risk.

Field: 6 W Crop: Corn-Field Grain, Irrigated South ID Yield: 210

W 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	N	P205	K20
Crop Nutrient Requirement	300	75	56
Nutrients From Soil	?	Mass.	
from Mineralized Nitrogen	0		
from Prior Crops	-35		

from Prior Bio-Nutrients	29		
from Irrigation Water	0		0
Nutrient Balance from above	307	75.4	56.4
Imported Nutrients	52	75	290
Estimated Remaining Nutrients Required	255	0	-234
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	255	0	-234

Acceptable: Sustainable agronomic rate.

Field: 7 E Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	0		
from Irrigation Water	0		0
Nutrient Balance from above	365.5	85.9	351
N/A	N/A	N/A	N/A
Estimated Remaining Nutrients Required	366	86	351
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	366	86	351

Acceptable: Sustainable agronomic rate.

Field: 8 E Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	26		
from Irrigation Water	0		0
Nutrient Balance from above	339.1	85.9	351
Imported Nutrients	48	69	264
Estimated Remaining Nutrients Required	291	17	87
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	291	17	87

Field: Gainza Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		

from Prior Bio-Nutrients	26		
from Irrigation Water	0		0
Nutrient Balance from above	339.1	85.9	351
Imported Nutrients	48	69	264
Estimated Remaining Nutrients Required		17	87
Commercial Fertilizer Application		0	0
Final Nutrient Balance	291	17	87

Acceptable: Sustainable agronomic rate.

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	Amount	Consumer	Consumer's Address	Telephone	Acres
No Data	No Data	No Data	No Data	No Data	No Data

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: 1 E

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application MethodRating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Very Low or N.A.

Manure Application Rate: N/A

Comments: No Data

Manure Phosphorus Application Method

Rating: Very Low or N.A.

Manure Application Method: N/A

Comments: No Data

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: 2 E

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P

Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management

Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 75.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Surface Irrigation or Overhead Irrigation

Comments: No Data

Rating: Very Low or N.A.

Rating: Very High

Rating: Medium

Rating: High

Rating: Very Low or N.A.

Rating: Low

Rating: Very High

Runoff Best Management Practices

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: 3 E

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P
Soil Test Depth: 18-24"

Rating: Critical

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Very Low or N.A.

Manure Application Rate: N/A

Comments: No Data

Manure Phosphorus Application Method

Rating: Very Low or N.A.

Manure Application Method: N/A

Comments: No Data

Irrigation Runoff Index (Irrigated)

Rating: Very High

Comments: Reduce irrigation applications to more closely match the infiltration rate of the soils on this

field.

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: 4 E

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be

implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P

Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Very Low or N.A.

Manure Application Rate: N/A

Comments: No Data

Manure Phosphorus Application Method

Rating: Very Low or N.A.

Manure Application Method: N/A

Comments: No Data

Irrigation Runoff Index (Irrigated)

Rating: Very High

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: 5 E

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Very Low or N.A.

Manure Application Rate: N/A

Comments: No Data

Manure Phosphorus Application Method Rating: Very Low or N.A.

Manure Application Method: N/A

Comments: No Data

Irrigation Runoff Index (Irrigated) Rating: Very High

Comments: Reduce irrigation applications to more closely match the infiltration rate of the soils on this

field.

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Rating: Very High

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: 5 W

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Very Low or N.A.

Manure Application Rate: N/A

Comments: No Data

Manure Phosphorus Application Method Rating: Very Low or N.A.

Manure Application Method: N/A

Comments: No Data

Irrigation Runoff Index (Irrigated) Rating: Very High

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Rating: Very High

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: 6 E

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Very Low or N.A.

Manure Application Rate: N/A

Comments: No Data

Manure Phosphorus Application Method

Rating: Very Low or N.A.

Manure Application Method: N/A

Comments: No Data

Irrigation Runoff Index (Irrigated)

Rating: Very High

Comments: No Data

Surface Irrigation or Overhead Irrigation

Comments: No Data

Rating: Very Low or N.A.

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: 6 W

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P

Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 75.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: 7 E

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Rating: Very High

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Very Low or N.A.

Manure Application Rate: N/A

Comments: No Data

Manure Phosphorus Application Method

Rating: Very Low or N.A.

Manure Application Method: N/A

Comments: No Data

Irrigation Runoff Index (Irrigated)

Rating: Very High

Comments: Reduce irrigation applications to more closely match the infiltration rate of the soils on this

field.

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: 8 E

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 68.7

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Gainza

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Rating: Critical

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 68.7

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: 1 E

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very High

Comments: Check and maintain system for leaky joints and worn-out pumps, sprinklers or nozzles. Use flow controllers to improve efficiency. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: 2 E

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical

Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: 3 E

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very High

Comments: Check and maintain system for leaky joints and worn-out pumps, sprinklers or nozzles. Use flow controllers to improve efficiency. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission,

this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: 4 E

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very High

Comments: No Data

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: 5 E

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very High

Comments: Check and maintain system for leaky joints and worn-out pumps, sprinklers or nozzles. Use flow controllers to improve efficiency. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: 5 W

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very High

Comments: No Data

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: 6 E

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very High

Comments: No Data

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: 6 W

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission,

this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: 7 E

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very High

Comments: Check and maintain system for leaky joints and worn-out pumps, sprinklers or nozzles. Use flow controllers to improve efficiency. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: 8 E

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Gainza

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: High

Comments: Check and maintain system for leaky joints and worn-out pumps, sprinklers or nozzles. Use flow controllers to improve efficiency. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

NUTRIENT RISK ANALYSIS Legend

ВМР	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover of perennial vegetation on land	This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or

retired from agriculture production.

enhances wildlife habitat.

Conservation Cropping Sequence

Growing crops in a recurring sequence on the same field.

This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.

Contour Farming

Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)

To reduce erosion and control water.

Cover and Green Manure Crop

A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.

To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.

Critical Area Planting

Planting vegetation on critically eroding areas that require extraordinary treatment.

This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe

gullies requiring specialized planting techniques and management.

An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.

Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.

A channel constructed across the slope with a supporting ridge on the lower side.

To divert excess water from one area for use or safe disposal in other areas.

A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.

To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.

Filter Strip

Dike or Berm

Diversion

Drip Irrigation

A strip or area of vegetation for removing pollutants water.

A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.

Fish Stream Improvement

Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.

The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.

Grade Stabilization

A structure used to control the

These structures are to: Stabilize

Construction

grade and head cutting in natural or artificial channels.

the grade and control erosion in natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.

Grassed Waterway

A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.

Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.

Grazing Land Mechanical Treatment

Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.

This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.

Heavy Use Area Protection Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures. To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.

Irrigation Land Leveling

Reshaping the surface of land to be irrigated to planned grades.

To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.

Irrigation Water Management Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.

Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize

irrigation induced soil erosion;
Decrease non-point source
pollution of surface and
groundwater resources; Manage
salts in the crop root zone; Manage
air, soil, or plant micro-climate.

Mulching

Applying plant residues or other suitable materials not produced on the site to the soil surface.

To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.

Polyacrylamide (PAM)

Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water. Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.

Prescribed Grazing

Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.

Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to:
1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.

Residue Management (Conservation Tillage)

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.

This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.

Riparian Forest Buffer

A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.

The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.

Sediment Basin

A basin constructed to collect and store debris or sediment.

A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

Sprinkler System

A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure. To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.

Stream Channel Stabilization

Stabilizing the channel of a stream with suitable structures.

To control aggradation or degradation in a stream channel.

Stream bank Protection

Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion. To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks,

Maintain the capacity of the channel, Control channel meander that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.

Strip-cropping, Contour

Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or closegrowing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.

To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.

Strip-cropping, Field

Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a closegrowing crop is alternated with a clean-tilled crop or fallow.

To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.

Subsurface Drains

A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.

The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.

Surge Irrigation

Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.

Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the field and a more uniform application. Tail water Recovery & Pumpback System

A facility to collect, store, and transport irrigation tail water for reuse in a farm irrigation distribution system.

To conserve farm irrigation water supplies and water quality by collecting the water that runs off the field surface for reuse on the farm.

Terraces

An earth embankment, a channel, or a combination ridge and channel constructed across the slope.

Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.

Use Exclusion

Excluding animals, people or vehicles from an area.

To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.

Water and Sediment Control Basin An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.

To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.

Watering Facility

A device (tank, trough, or other watertight container) for providing animal access to water.

To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.

Wetland Development/Restoration The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland. To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S.

Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculate the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0- to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct a S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes, and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops would have sufficient residual for alfalfa.

BORON

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do not use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the re-growth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition.

Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however.

Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage.

Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

Corn-Field Grain, Irrigated South ID NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Adequate N is necessary for maximum economic production of irrigated field corn used for silage or grain. Fertilizer N represents by far the largest share of the fertilizer costs for field corn in Idaho. The amount of N required depends on many factors that influence total corn production and quality. These factors include length of growing season, corn hybrid, previous crop, past fertilizer use, soil type, leaching hazard and previous manuring. Estimates of both the N available to corn during the season and the yield potential of the crop should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical field corn yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a good field corn yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by triticale for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in preplant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of field corn.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which field corn is grown occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to field corn. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation

system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =

(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test)

- (previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Coarse-textured soils, including sandy loams, loamy soils and sands, may lose N from leaching. For these soils, side dress a portion of the N at the time of the last cultivation. Sprinkler irrigation of corn under center pivots provides increased flexibility for providing N during the season. With sprinklers N can be injected into the system and applied with the water. On silt loam soils, split applications of N have not proven more effective as long as preplant N is adequately incorporated. High N rates (approaching 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered. High plant populations (above 28,000 to 30,000) and early plantings of longer season hybrids in the Treasure Valley will respond to high N rates provided there are no other limiting factors. High N rates will not compensate for reductions in stand or delayed plantings. High plant populations of field corn are more susceptible to N shortages because of greater competition among plants for limited N. Side dressing may cause root pruning depending on plant size, distance of shank from the row and placement depth. High N rates (above 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered. On sandy textured soils subject to leaching, side dress a portion of the N at the time of the last cultivation. Under sprinkler irrigations, N can be injected through the lines throughout the season. On silt loam soils, split applications of N have not proven more effective as long as preplant N is adequately incorporated.

PHOSPHORUS

Adequate phosphorus (P) is necessary for maximum production of field corn. The soil test for P is based on samples collected from the first foot of soil. The soil is extracted with sodium bicarbonate. Economic response to fertilizer P is more likely with cooler soil temperatures and soils with high lime content, particularly when planting long season hybrids. Phosphorus is an immobile nutrient that does not move appreciably from where it is placed. It should be mixed into the seedbed or banded within easy reach of the seedling roots before or during the planting operation.

POTASSIUM

Field corn requires adequate potassium (K) for optimum growth. Soil test K can be useful in determining the need for K fertilizers. The soil sample is taken from the first foot of soil and extracted with sodium bicarbonate. Fertilizer K rates are based on soil test.

MICRONUTRIENTS

Zinc (Zn) deficiencies occur primarily on soils that are eroded, leveled or where the exposed subsoil is higher in lime. The DTPA test on soil samples collected from the first foot can be used for identifying

Zn fertilizer needs. Apply 10 pounds of Zn per acre when the soil test measures less than 0.6 ppm. Other micronutrients have not been shown to limit corn production. "Shotgun" applications of micronutrient mixtures containing boron (B), copper (Cu), iron (Fe) and manganese (Mn) "for insurance" have not been shown to be economical and are not recommended.

SULFUR (S)

The major corn-growing regions in Idaho should not experience shortages of S. Areas with S deficiencies include some irrigated areas where both the soil and irrigation water are low in S. Snake River water is known to have high S concentrations. Coarse-textured soils including sandy loams, loamy sands and sands would be more susceptible to S deficiencies than silt loam soils. Where the need for S is evident, use 30 pounds per acre of sulfate-sulfur (S04).

SALINITY (SALTS)

Field corn has a low to moderate tolerance to accumulated salts. Soils with total salt readings above 3 or 4 mmhos/cm can be cropped effectively. Readings up to 6 are also satisfactory although more careful water management may be required.

Potatoes NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Most Idaho potato fields will respond to fertilizer nitrogen (N). The N rate used, along with other management factors, particularly irrigation, can have a marked effect on the yield and quality of the potato crop.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical potato yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a good potato yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by potatoes for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

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collected before seeding in the spring to represent the area to be fertilized.

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Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of potatoes.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which potatoes are grown rarely receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters. For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to potatoes. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =

(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test)

- (previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizer recommendations are for Russet Burbank potatoes grown on sandy loam soils. Adjustments are made for very sandy soils (add 30 lb N/acre) and silt loam soils (subtract 40 lb N/acre) to account for differences in nitrogen mineralization rates and nitrogen use efficiency. To maximize yield and quality, growers should aim to have about 40 to 45% of their total N supply applied by row closure. Nitrogen applications made during tuber bulking should be guided by petiole sampling to maintain at least 15,000 ppm N03-N in the fourth petiole from the growing tip.

Excess levels of soil N at or before tuberization can delay tuber growth, reduce yields and lower tuber specific gravity. Excess N in late summer and fall can delay maturity of the tubers. This delayed tuber maturity can adversely affect tuber storability and quality.

The N needs of the potato crop are best met by split-application of N fertilizer. This involves applying lower rates of N fertilizer preplant and at planting, with the remainder of the crop's N needs applied with the irrigation water. Some cropping systems - for example, furrow irrigation - make it difficult to apply N fertilizer and get efficient plant uptake. Under these conditions most of the crop N needs are applied to the soil before planting.

Nitrogen applied with irrigation water is an effective way to supplement the crop during the growing season. Do not use aqua or anhydrous ammonia in sprinkler system applications. Applications through a sprinkler system are not folar fertilization.

PHOSPHORUS

Potato plants need phosphorus (P) for plant growth and will respond to P fertilizer if the soil test concentration is low. Phosphorus soil test for potatoes is based on an extraction with sodium bicarbonate. Soil samples for a phosphorus soil test should be taken from 0- to 12-inch depths. This depth of sampling is critical to achieve an accurate soil test P level. Deviation in sampling depth from the 12-inch depth may drastically alter soil test results.

Phosphorus is immobile in soil and therefore does not move from where it is placed. Applied P fertilizer must be mixed into the seedbed before planting for best results. Banding P fertilizer along side plants has not been as effective as P fertilizer that has been broadcast and incorporated. Eroded or scraped areas, commonly referred to as "white soil" areas, may be low in available P because of its high content of "free lime." These areas should be tested and fertilized separately. To compensate for low P availability when free lime is present in the soil, rates of P are increased with increasing levels of free lime. Total phosphorus concentrations should be kept above 0.22% in the fourth petiole during tuber bulking.

POTASSIUM

Potatoes require high levels of available potassium (K). Potassium is relatively immobile in the soil. For best results, K fertilizers should be applied preplant and mixed into the seedbed. Banding beside the plants has been used successfully but is not as effective as K fertilizer which has been broadcast and incorporated.

Potassium fertilizer applications reduce specific gravity of harvested tubers. Potassium chloride fertilizer (KCl or muriate of potash) lowers specific gravity of tubers more than potassium sulfate fertilizer (K2SO4 or sulfate of potash). Growers should avoid over-fertilization of potatoes with K fertilizers. When specific gravity of tubers is important, potassium sulfate is the preferred K fertilizer source. Total potassium concentrations should be kept above 7.0% in the fourth petiole during tuber bulking.

SULFUR

Potatoes generally do not respond to sulfur (S) fertilization. Sulfur response is most likely to occur in

sandy soils and in areas where irrigation water sources are low in S. Water low in S includes mountain streams and some well waters. The more irrigation return-flow in the water source the greater the amount of dissolved, plant-available sulfate (S04) form. Elemental sulfur is not recommended because it is not immediately available to plants. Elemental sulfur will require several months from time of application until it is converted to plant-available form.

MICRONUTRIENTS

"Shotgun" application of micronutrients - I.e. complete mixes containing boron (B), copper (Cu), iron (Fe), manganese (Mn) and zinc (Zn) - "for insurance" are not recommended since these elements have not been shown to give an economical response. Soil tests for individual micronutrients are available and concentrations in the 0- to 1-inch soil sample are: B = 0.5 ppm, Cu = 0.2 ppm, Fe = 4.0 ppm, Mn = 2.0 ppm, Zn = 0.5 ppm. Critical concentrations represent values below which a response from the application of that micronutrient may be obtained.

Zinc deficiencies have not been widespread on potatoes although some crops in certain areas of southern Idaho do show a Zn deficiency. When the soil test for Zn is below the critical concentration or where land leveling or erosion has exposed white subsoil containing free lime, apply Zn fertilizer at a rate which will supply 10 pounds of Zn per acre or equivalent. This amount of Zn should be sufficient for 4 to 6 years of crop production.

GENERAL COMMENTS

The P, K, and Zn nutritional status of the plant should also be monitored during the growing season. The same petiole sample used for N03-N concentrations can also be used for this purpose. Guidelines for adequate concentrations of these and other nutrients in the petiole can be obtained from your county agricultural Extension agent, consultant, or fieldsman.

Fertilizer materials containing P, K and Zn should be thoroughly incorporated into the root zone. These materials can be effectively applied in the fall.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldsman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:
 - 1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.
 - Accurately calibrate nutrient application equipment to insure that recommended rates are applied.
 - 3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data Date of Test: No Data

Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
E <i>C</i>	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	

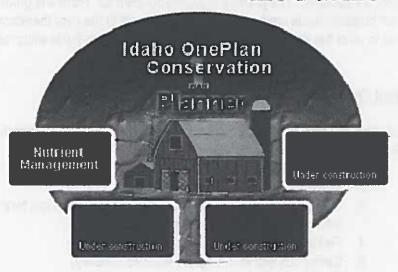
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
Р	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	1111-5-
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

5

Grandview Farm 4

Nutrient Management Plan

Agriculture . . . Launching into the Future



Nutrient Management Plan Prepared For:

Grandview Farms (208) 834-2231 Farm 4

Certified Planner:

Michael Mitchell
Professional Engineer, EAC Engineering, Inc
(559) 381-0607

Producer Signature:	Certificated Planner Signature:	
	Date Completed: 10-02-07	

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27.17D6)

GRANDVIEW - FARM 4 Producer Summary

Farm Summary

Farm 4 is an existing farm located 7.5 miles southwest of Mountain Home Air force Base. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of twenty six fields irrigated with handlines for a total of 1278 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot.

Farm Resource Concerns

Farm 4 is located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 00'31" 42N 59'19" using GPS Coordinates. The primary resource concern for Farm 4 is ground water quality. The farm sits along the Snake River however fields are bermed to prevent runoff to the river therefore runoff is not likely to occur. Solid waste is applied to all of the fields and pasture and incorporated on fields within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

- 1. Fertilizer application rates
- 2. Manure/Compost application rates
- 3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
- 4. Fields to which the nutrients are applied
- 5. Spring soil test for nitrogen (required annually) 0-12" and 12-24" nitrogen test

Crop Nutrient Requirement						
Crop	Pounds of P205 per acres					
Alfalfa	86					
Potatoes	76					
Wheat	66					
Sugarbeets	48					

Manure/Co	Manure/Compost field application requirement (tons)										
Acres X crop nutrient requirement + manure p205 value* = Tons required											
Example	Corn - 250(acres)	X 75 (crop requirement)	+ 16.85								
Com	250	X 75** = 18750	+ 16.85* = 1112.76 tons								

^{*}based on manure test values for P205

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water managements responds to these crop demands. It is recommended that:

Irrigation schedules continue to be managed by your irrigation specialist.

^{**}pounds of p205 required per acre

 Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Farm 4 ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

- 1) Assure proper containment of animal manure and process waste water
- 2) Assess resource concerns which exist on the property
- 3) Budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.
- 4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fills.

Nitrogen in the form of nitrate (NO₁) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue). Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1):

Grandview Farms

Address:

1304 Hwy 67, Grandview, IDAHO 83624

Phone:

(208) 834-2231 N/A

N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation

District:

Elmore

County:

Elmore

Watershed Basin:

Middle Snake-succor (USGS Hydrologic Unit Code # 17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Farm 4 is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

																		_		
WATERBODY	BOUNDARIES	ВАСТ	CHAN STAB	DO	FLOW	HAB ALT	MET HG	MET	NH3	NUTR	0_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	X

Farm 4 is <u>not</u> located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

<u>Priority 1</u> is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

<u>Priority 2</u> is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Farm 4 is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

- Open Irrigation Water Conveyances Irrigation tail water can deliver nutrients to surface water via open canals. Nutrient loading of open canals can have a detrimental affect on the health of receiving waters.
- Surface Water Surface water has water quality standards based on the designated use of the water body. These water quality standards must be met or the water body is listed as water quality impaired and falls under the TMDL process. Good irrigation and nutrient management practices will help keep nutrients available for crop use and decrease the nutrient loading into surface water.

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
F 10	Hard Pan	20
	Water Table	>72
F 11	Hard Pan	20
	Water Table	>72
F 15	Hard Pan	20
	Water Table	>72
F 16	Water Table	>72
F 18	Cobbles	26
	Fractured Bedrock	20
	Water Table	42
F 19	Cobbles	26
	Water Table	42
F 2	Water Table	>72
F 20	Water Table	>72
F 21	Cobbles	26
	Water Table	>72
F 22	Water Table	>72
F 23	Cobbles	13
	Hard Pan	20
	Water Table	>72
F 24	Cobbles	26

	Hard Pan	20
	Water Table	>72
F 25	Cobbles	13
	Hard Pan	20
	Water Table	>72
F 3	Fractured Bedrock	20
	Water Table	>72
F4 o gala	Water Table	>72
F 5	Water Table	>72
F 6	Fractured Bedrock	20
	Water Table	>72
F 7N	Fractured Bedrock	20
	Water Table	>72
F 7S	Water Table	>72
F 8	Hard Pan	20
	Fractured Bedrock	20
<u></u>	Water Table	>72
F 9	Hard Pan	20
	Fractured Bedrock	20
	Water Table	>72
F1	Water Table	>72
F12	Hard Pan	20
	Fractured Bedrock	20
	Water Table	>72
F13	Hard Pan	20
	Water Table	>72
F14	Water Table	>72
F17	Water Table	>72

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No	No	No Data	No	No	No	No	No	No Doto	No Doto	No Doto	No Data
Data	Data	No Data	Data	Data	Data	Data	Data	NO Data	No Dala	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a

surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Thresh hold Soil Test Depth
F 10	Groundwater < 5'	20	18 - 24"
F 11	Groundwater < 51	20	18 - 24"
F 15	Groundwater < 5'	20	18 - 24"
F 16	Groundwater >=5'	30	18 - 24"
F 18	Groundwater < 5'	20	18 - 24"
F 19	Groundwater < 5'	20	18 - 24"
F 2	Groundwater >=5'	30	18 - 24"
F 20	Groundwater >=5'	30	18 - 24"
F 21	Groundwater < 5'	20	18 - 24"
F 22	Groundwater >=5'	30	18 - 24"
F 23	Groundwater < 5'	20	18 - 24"
F 24	Groundwater < 5'	20	18 - 24"
F 25	Groundwater < 5'	20	18 - 24"
F 3	Groundwater < 5'	20	18 - 24"
F 4	Groundwater >=5'	30	18 - 24"
F 5	Groundwater >=5'	30	18 - 24"
F 6	Groundwater < 5'	20	18 - 24"
F 7N	Groundwater < 5'	20	18 - 24"
F 7S	Groundwater >=5'	30	18 - 24"
F 8	Groundwater < 5'	20	18 - 24"

F 9	Groundwater < 5'	20	18 - 24"
F1	Groundwater >=5'	30	18 - 24"
F12	Groundwater < 5'	20	18 - 24"
F13	Groundwater < 5'	20	18 - 24"
F14	Groundwater >=5'	30	18 - 24"
F17	Groundwater >=5'	30	18 - 24"

Farm Location

Idaho Transverse Mercator
Coordinates of the farm center (meters): X = 2336733.43912755, Y = 1311100.50462935
Map Scale: 1:297



Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2336733.43912755, Y = 1311100.50462935Map Scale: 1:305

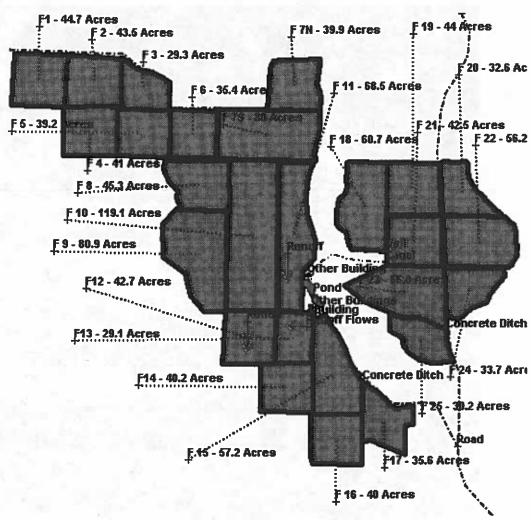


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: F 10

Name	Мал Арр		Imported Nutrients	Miner	alization	T	otal
			5-T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	56	N	0	N	56
, ,		P	82			P	82
		K	313			ĸ	313
			STE/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	56	N	31	N	87
		P	82	8		P	82
		K	313			K	313
			S,T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	Ν	56	N	31	Z	87
	_	P	82			P	82
		K	313			ĸ	313
			5 Trac				
Alfaifa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	56	N	31	N	87
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		P	82			P	82
		K	313			ĸ	313
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y	Z	56	N	31	N	87
		P	62			P	82
		K	313			ĸ	313
			5.TVec.		,		
Wheat-Winter, Irrigated South ID(2009)	Y	N	56	N	76	Ν	132
		P	82			P	82
		K	313			κ	313
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y	N	56	N	31	N	87
-,,		P	82			P	82
		ĸ	313			ĸ	313

FIELD: F 11

Name	Man App		Imported Nutrients	Miner	alization	7	otal
			3 T/ac			Γ	
Sugar beets(2004)	Y	N	40	N	0	N	40
		P	- 57			P	57
		K	220			к	220
3 E 19		Γ	3 T/pc			Γ	
Potatoes(2005)	Y	N	40	N	22	N	62
		P	57			P	57
65 00	Ì	K	220			К	220

4.			3/T/ac			T	
Sugar beets(2006)	Y	N	40	N	22	N	62
J	•	P	57			P	57
		K	220			ĸ	220
			3 T/ac			Τ	
Sugar beets(2007)	Y	N	40	N	22	N	62
Sugar vecto(ssor)	•	P	57			P	57
		к	220			K	220

FIELD: F 15

Name	Мал Арр		Imported Nutrient	Miner	alization	1	otal
		Γ	ST/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	И	56	N	0	N	56
		P	82			P	82
		K	313			к	3 I
			5°T/ac			L	L
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	56	N	31	N	87
		P	82			P	82
		K	, 313			K	31
			5T/ec				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	Ŋ	56	N	31	N	87
		P	82	灩		P	82
		к	313			K	31
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	56	N	31	N	87
,		P	82			P	82
		ĸ	313			ĸ	31.
			5 Trac				
Wheat-Winter, Irrigated South ID(2008)	Y	N	56	N	76	N	13
		P	82			P	82
		ĸ	313			K	31
		,	5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y	N	56	N	31	Ŋ	87
		P	82			P	87
		K	313			K	31
			6T/m				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y	N	56	N	31	N	87
		P	82			₽	82
		ĸ	313			k	31

FIELD: F 16

Name	Man App		Imported Nutrients	Miner	alization	Т	otal
		Ī	417sc				
Potatoes(2004)	l _v	N	45	N	0	Ŋ	45
Pointoes(2004)	Ι.	P	66	100	500	P	66
		K	251			ĸ	25E
Wheat-Winter, Irrigated South ID(2005)	Y		4 T/ac				

		N	45	N	70	N	115
9		P	66	2.45		P	66
		к	251			K	251
			ATIA			П	
Wheat-Winter, Irrigated South ID(2006)	Y	N	45	N	20	N	65
eat-Winter, Irrigated South ID(2006)		P	66			P	66
		ĸ	251			к	251
		1	4 Disc			П	
Potatoes(2007)	Y	N	45	N	25	N	70
	•	P	66		200	P	66
7		К	251		100	κ	251

FIELD: F 18

Name	Man A	P.	Imported Nutrien	Miner	alizatio	9	'otal
		T	417/10			T	Γ
Sugar beets(2004)	Y	N	48	N	0	N	48
	1	P	70			P	70
		K	268			K	261
		T	4/17/ac	ST COLUMN TO ST		T	Г
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	48	N	27	N	75
		P	70		-80	P	70
		к	268		28	K	268
		Τ	4-Tine			Ι	Γ
Potatoes(2006)	Y	N	48	N	27	N	75
,	-	P	70	100	100	P	70
		K	268			К	261
c c			470/ac			Τ	Γ
Sugar beets(2007)	Y	N	48	N	27	N	75
	ľ	P	70			P	70
		к	268			К	268

FIELD: F 19

Name	Man App	Γ	Imported Nutrients	Miner	alization	7	otal
		Γ	3 Tiac			Γ	Γ
Sugar beets(2004)	Y	N	40	N	0	N	40
J. J	_	P	57			₽	57
	;	ĸ	220			K	220
		Г	File			Г	
Potatoes(2005)	Y	N	40	N	22	N	62
. ()		P	57			P	57
		K	220		1000	K	220
			3 Tine				
Sugar beets(2006)	Y	N	40	N	22	N	62
Dagas 0000(2000)	_	P	57			P	57
		K	220			ĸ	220
Sugar beets(2007)	Y		3 T/ac				
		N	40	N	22	И	62

P	57	P 5	7
K	220	K 22	20

FIELD: F 2

Name	Мап Арр		Imported Nutrients	Mine	ralization	T	ota
			4The				
Sugar beets(2004)	_Y	N	42	N	0	N	42
	-	P	61			P	61
		ĸ	236		200	K	23
			4 T/ac				
Wheat-Winter, Irrigated South ID(2005)	V Y	N	42	N	69	N	11
······································		P	61			Þ	61
		K	236			K	234
			4/E/ac				
Potatoes(2006)	y	Z	42	N	-14	N	28
		P	61			P	61
		K	236			K	236
			4 Trac				
Sugar beets(2007)	Y	N	42	N	24	N	66
	1	₽	61			P	61
		K	236			K	230

FIELD: F 20

Name	Man App		Imported Nutrient	s Min	eralizati or	1	ota
			5 Tiec				Γ
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	И	56	N	0	N	50
		P	82			P	83
		K	313	ᇔ		K	31
			5 Trac				
Wheat-Winter, frrigated South ID(2005)	_Y	N	56	N	130	N	18
		P	82			P	8
1,002		ĸ	313	藝		ĸ	3
		П	5 Trac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	56	N	-7	N	4
	Ť	P	82			P	8
		ĸ	313			κ	3
			5/T/jic				
Ufalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	56	N	31	N	8
		P	82	總		P	8
		ĸ	313			K	3
			S T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y	N	56	N	31	N	8
	Ť	P	82			P	8
		κ	313			κ	31
Ifalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5-T/ac				
		N	56	N	31	N	8
		P	82	97	PRESERVE	P	8

		к	313			к	313
		20000	5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y	N	56	N	31	N	87
		P	82			P	82
		к	313		190	K	313

FIELD: F 21

Name	Man App		Imported Nutrients	Miner	alization	T	otal
		ľ	3 T/ac		, i	Ī	
Sugar beets(2004)	Y	N	40	N	0	Ŋ	40
g + ,		P	57			P	57
		ĸ	220			K	220
• • • • • • • • • • • • • • • • • • • •			3 T/ac				
Potatoes(2005)	Y	N	40	N	22	N	62
1 0000(000)		P	57			P	57
		K	220			ĸ	220
			3 T/ac			Π	
Sugar beets(2006)	Y	Z	40	N	22	N	62
	_	P	57			P	57
		K	220			ĸ	220
		,	3 The				
Sugar beets(2007)	Y	Ν	40	N	22	N	62
		P	57			P	57
		ĸ	220		Wag.	к	220

FIELD: F 22

Name	Мап Арр		Imported Nutrient	Miner	dization	T	otal
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	56	N	0	N	56
		P	82		1938	P	82
		к	313	0.5		ĸ	31
		ľ	5T/sc				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	56	N	31	N	87
, man, 12, 11, 2000 0000 12 000 11 0000 (0000)		P	82			P	82
		K	313		線源	ĸ	31
		Γ	5 T/ac				Г
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	56	N	31	N	67
and the start of t	1	P	82		1307	P	82
		k	313			К	31
		Ι	5°T/ac				Г
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	56	N	31	N	8
	1	P	82			P	8.7
		ĸ	313			ĸ	31
			\$ T/eq			ſ	
Wheat-Winter, Irrigated South ID(2008)	Y	Z	56	N	76	N	13
water-winter, angust Soun III(2006)	'	P	82	7.65	100	P	8:
		K	313	1994	(6)	ĸ	31

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)			5/T/ac				
	Y	N	56	N	31	N	87
		P	82	15		P	82
		K.	313			к	313
			5 Dac			П	П
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y	N	56	N	31	N	87
THE STATE STATE AND ADDRESS OF THE STATE S	-	P	82			P	82
		К	313	1		K	313

FIELD: F 23

Name	Мап Арр	1	Imported Nutrients	nts Mineraliza		tion To	
		Γ	B'T/ac				
Potatoes(2004)	Y	N	45	N	. 0	Z	45
,		P	66			P	66
		K	251			ĸ	251
			4T/ac				
Wheat-Winter, Irrigated South ID(2005)	Y	N	45	N	70	N	115
Trinon-Trinon, ariganou account as (2000)	Ť	P	66			₽	66
		ĸ	251	题		K	251
		Γ	4 Tlec				
Wheat-Winter, Irrigated South ID(2006)	Y	N	45	N	20	Z	65
,		P	66			P	66
		ĸ	251			K	251
			4 Tipo				
Potatoes(2007)	Y	N	45	N	25	N	70
FOLLOS (2007)	•	P	66			P	66
		K	251			K	251

FIELD: F 24

Name	Man Apı	ł	Imported Nutrient	Miner	alization	T	otal
		T	4Thc				
Potatoes(2004)	l _v	N	45	N	0	N	45
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	`	P	66			P	66
		K	251			K	251
·			4 Wac				
Wheat-Winter, Irrigated South ID(2005)	Y	N	45	N	70	N	115
1130mi. 1140mi' milimoon noon on (m. o.)	1	P	66			P	66
		ĸ	251			ĸ	251
	Y	T	4 Trac			Г	Г
Wheat-Winter, Irrigated South ID(2006)		N	45	N	20	N	65
		P	66			P	66
		K	251			K	251
		Γ	4 ID/ac				
Potatoes(2007)	Y	N	45	N	25	N	70
		P	66			P	66
		к	251			ĸ	251

FIELD: F 25

Name	Мал Арр		Imported Nutrients	Miner	alization	Т	otal
		Γ	A Tr/ac				Γ
Potatoes(2004)	_Y	N	45	N	0	N	45
,	`	₽	66	E STATE		P	66
		ĸ	251			ĸ	251
		Γ	4 Tac				Γ
Wheat-Winter, Irrigated South ID(2005)	V V	N	45	N	70	N	115
]	P	66			P	66
		K	251	3		ĸ	251
		Г	4 T/ac				Г
Wheat-Winter, Irrigated South ID(2006)	Y	N	45	N	20	Ν	65
		P	66			P	66
		K	251			ĸ	251
		Γ	4 Trac				Γ
Potatoes(2007)	_Y	N	45	N	25	Ň	70
		P	66			P	66
		K	251			ĸ	251

FIELD: F 3

Name	Мал Арр		Imported Nutrients	Miner	alizatio	n T	otal
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	И	56	N	0	N	56
,	-	P	82	Sept.	38	₽	82
		K	313			K	31:
			5 Trisc				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Υ	N	56	N	31	N	87
	ı	P	82	26		P	82
		ĸ	313	7		K	31:
			5 Triac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006	Y	N	56	N	31	N	87
		P	82			P	82
		ĸ	313			K	3 L
			5 This	L			
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	Z	56	N	31	N	87
		P	82			₽	82
		ĸ	313	700	17.25	K	31:
0 V St 2			S Trac				
Wheat-Winter, Irrigated South ID(2008)	Y	N	56	N	76	N	13:
		P	82			P	82
		K	313		450	K	31:
	9	Ц	5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y	N	56	N	31	N	87
••••••••••••••••••••••••••••••••••••••		P	82		1	P	82
	1	K	313		1	K	31:
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y		5 The			1	
		N	56	N	31	N	87

	P	82	P 82
, and a second	K	313	K 313

FIELD: F 4

Name	Man App		Imported Nutrients	Mine	alization	Т	otal
	1		ATT/ac				
Sugar beets(2004)	Y	N	42	N	0	N	42
	_	P	61			P	61
		K	236			K	236
			Film			1	Г
Wheat-Winter, Irrigated South ID(2005)	1 1	N	42	N	69	N	111
		þ	61			P	61
		ĸ	236			ĸ	236
			4 Tyac	100			
Potatoes(2006)	Y	N	42	N	-14	N	28
5 2.00.00 Me	850	P	61			P	61
	ģ	K	236			ĸ	236
			4-10/ac				
Sugar beets(2007)	Y	N	42	N	24	N	66
	1000	P	61			P	61
		ĸ	236			K	236

FIELD: F 5

Name	Man App	1	Imported Nutrient	Miner	afization	Т	otal
			5/T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	l _v	N	56	N	0	N	56
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		P	82	D. S.		P	82
		K	313			K	31
			S (IVac		305-47		
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	56	N	31	N	87
		P	82			P	82
		ĸ	313	100		ĸ	31
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)		П	5 Than				
	Y	N	56	N	31	Z	87
		P	82	10.00	1820	P	82
		K	3 3			K	31
- 1000 = 1			5 Trac.				
Affalfa Hay, Irrigated South ED-Cut Mid Bloom(2007)	Y	N	56	i N			87
		P	82			P	82
		K	313		NESS.	ĸ	31
			5 q7ac				
Wheat-Winter, Irrigated South ID(2008)	Y	N	56	N	76	N	13
		P	82		33	P	83
		ĸ	313			K	31
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/aç				
	- 5	N	56	N	31	N	87
		P	82	(本語)	1995	p	87

		к	313			K	313
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)			5 T/sc				
	Y	N	56	N	31	N	87
		P	82	13		P	82
		ĸ	313			К	313

FIELD: F 6

Name	Man App		Imported Nutrients	Miner	alization	ī	otal
			5 Tgac			L	L
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	56	N	0	Ñ	56
		P	82		等室	P	82
		ĸ	313			k	313
			%T/ac			L	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	56	N	31	N	87
		P	82			P	82
		K	313			K	313
			5 TVac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	56	N	31	N	87
,		₽	82	F1.44		P	82
		K	313			K	313
			5.Thc				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	Ν	56	N	31	N	87
		P	82			P	82
		ĸ	313			K	313
			5°T/ac				-
Wheat-Winter, Irrigated South ID(2008)	Y	N	56	N	76	N	132
		P	62	22.0		P	82
		K	313			K	313
			TT/ac			Ш	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y	N	56	N	31	N	87
		P	82			P	82
		K	313			K	313
			ST/ap.				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y	N	56	N	31	N	87
,,,	7 Y	P	82			P	82
		K	313			K	313

FIELD: F 7N

Name	Man App		Imported Nutrient	Miner	alization	Т	otal
Sugar beets(2004)			417/ac			T	
	Y	N	48	N	0	Ν	48
		₽	70		968	P	70
		K	268			ĸ	268
		Γ	4.37%c				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	Z	48	N	27	N	75
		P	70			P	70
		к	268		銀稿	ĸ	268

		10000	4 The			Π	
Potatoes(2006)	Y	N	48	N	27	N	75
1 02002(2000)		P	70		Ser.	P	70
	i	K	268			К	268
Sugar beets(2007)			4.T/ac				
	Y	N	48	N	27	N	75
		P	70			P	70
		К	268		34	к	268

FIELD: F 7S

Name	Man App		Imported Nutrients	Miner	alization	1	ota
		Γ	5 TVac			Ī	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	56	N	0	N	54
		P	82	鏖		P	8;
		K	313			K	31
			S Time	_			L
Affalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	56	N	31	N	8
		P	82			P	8:
		ĸ	313			K	31
·			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	Z	56	N	31	N	87
		P	82			P	82
		ĸ	313			Ķ	31
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)			5 T/ac		10000	ı	
	Y	2	56	N	31	Ν	87
		P	B2			P	82
		K	313	100		к	31
			5 T/ac				
Wheat-Winter, Irrigated South ID(2008)	Y	N	56	N	76	N	13
		P	82			P	82
		ĸ	313			K	31
			5 T/ec				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y	N	56	N	31	Ν	87
		₽	82	123		P	82
		κ	313			K	31
		П	.5 The				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y	N	56	N	31	N	87
	1	P	82	雪		₽	82
		K	313	DE P		к	31

FIELD: F 8

Name	Man App	An App Imported Nutrients I		Miner	1	otal	
		Ī	3 T/ac				
iugar beets(2004) Y	N	40	N	0	N	40	
	-	P	57			P	57
		K	220			K	220
Potatoes(2005)	Y		33/ac				Г

		N	40	N	22	N	62
		P	57	10.5		P	57
J		к	220	3		K	220
			3 Trac			Τ	
Sugar beets(2006)	Y	N	40	N	22	N	62
Sugar beets(2000)	·	P	57		100	P	57
		К	220			K	220
		THE STREET	3 T/ac	400		Τ	
Sugar beets(2007)	Y	N	40	N	27	N	62
	•	P	57		E.S.	P	57
		К	220	E		ĸ	220

FIELD: F 9

Name	Мал Ар	P	Imported Nutrient	Miner	Mineralization		
		Ť	4The				
Potatoes(2004)	Y	N	45	N	0	N	45
	· ·	P	66		6	P	66
		К	251			K	25
		T	4 Trac				Γ
Wheat-Winter, Irrigated South ID(2005)	Y	N	45	N	70	Ν	11:
	•	P	66		(C)	P	66
	<u> </u>	К	251			ĸ	251
		Γ	4717ac				Γ
Wheat-Winter, Irrigated South ID(2006)	Y	N	45	N	20	N	65
		P	66			P	66
		ĸ	251			ĸ	251
		I	4.T/ac				
Potatoes(2007)	Y	N	45	N	25	N	70
		P	66			P	66
		K	251	33	1000	ĸ	251

FIELD: F1

Name	Man Ap	P P	Imported Nutrien	ts Miner	Mineralization		
		T	4/T/ac			h	
Potatoes(2004)	_Y	N	45	N	0	N	45
* *************************************		P	66			P	66
		K	251			ĸ	251
		T	4 T/ac			П	
Wheat-Winter, Irrigated South ID(2005)	Y	Z	45	N	70	N	115
	1	P	66			P	66
		К	251			K	251
			ATIM				
Wheat-Winter, Irrigated South ID(2006)	Y	N	45	N	20	N	65
······································	`	P	66	Light.		P	66
		к	251			ĸ	251
Potatocs(2007)	Υ	П	4 Tric				
		N	45	N	25	N	70

P	66	P 66
к	251	K 251

FIELD: F12

Name	Man App		Imported Nutrients	Miner	alization	Ţ	otal
			4.Thic				
Potatoes(2004)	_Y	N	45	N	0	N	45
	-	P	66			₽	66
		K	251			K	251
			ATV4s				
Wheat-Winter, Irrigated South ID(2005)	Y	N	45	N	70	Ν	115
	-	P	66			P	66
		K	251			K	251
			ATT/ac				
Wheat-Winter, Irrigated South ID(2006)	Y	N	45	N	20	N	65
,	•	P	66			P	66
		K	251			K	251
			4 The				
Potatnes(2007)	Y	N	45	N,	25	N	70
	_	P	66			P	66
		ĸ	251			ĸ	251

FIELD: F13

Name	Man App		Imported Nutrients	Miner	alization	Т	otal
			3 T/ec			Γ	
Sugar beets(2004)	Y	Z	40	N	0	N	40
,		P	57			P	57
		K	220			K	220
			3 Tyac				
Potatoes(2005)	Y	Z	40	N	22	Z	62
, ,		P	57			P	57
		K	220			K	220
		Ī	37T/ac				
Sugar beets(2006)	Y	N	40	N	22	Z	62
		P	57			P	57
		K	220			K	220
			3/0/ac				
Sugar beets(2007)	Y	N	40	N	22	Z	62
	·	P	57			P	57
		K	220			K	220

FIELD: F14

Name Potatoes(2004)	Man App	1	Imported Nutrients	Mineralization			otal
Potatoes(2004)	Y		4 This			Ī	- 2
	Ī	٧Ī	45	N	0	N	45
		P	66	1		P	66

	Þ	K	251	100	P. Sec	K 251
,		2000	4 T/ac	600		\prod
Wheat-Winter, Irrigated South ID(2005)	Y	N	45	N	70	N115
, , ,	·	P	66		STATE OF	P 66
		ĸ	251			K 251
		100	-4THac	-		П
Wheat-Winter, Irrigated South ED(2006)	Y	И	45	N	20	N 65
, , ,		P	66		200	P 66
		К	251		100	K 251
		Service of the leading of the leadin	ATTrac			\prod
Potatoes(2007)	Y	N	45	N	25	N 70
		Р	66		N. FE	P 66
		K	251			K 251

FIELD: F17

Name	Man App		Imported Nutrients	Miner	alization	Т	otal
		Ī	STE/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	56	N	0	N	56
, , , , , , , , , , , , , , , , , , , ,	`	P	82		200	P	82
		K	313			K	31:
			5 T/ec				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	56	N	31	N	87
		P	82		W. E.	P	8.2
		ĸ	313		图图	ĸ	31
			ST/sc				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	56	N	31	Ŋ	87
	`	P	82			P	82
		K	313			ĸ	31
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)			5 T/ac				
	Υ	N	56	N	31	N	87
,	_	P	82			P	82
		K	313			ĸ	31:
			5 T/sc				
Wheat-Winter, Irrigated South ID(2008)	Y	И	56	N	76	Ν	13:
		P	82			₽	82
		K	313			K	31
			5 Trac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y	N	56	N	31	N	87
manie 12ay, ii i gasco 300m 12-Cut wire Broung 2007)		P	82	1	22	₽	82
		K	313			K	31
			5/Truc				
Alfalfa Hay, frrigated South ID-Cut Mid Bloom(2010)	Y	N	56	N	31	И	87
		P	82			P	82
		K	313			ĸ	31:

Minimum Acres Required for Manure Application

Mannre Group	Acres
Imported Nutrients	1053

The acreage in the table is based on an average crop uptake of 100 lbs P₂O₅ per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture Division of Animal Industries.

Hydraulic Balance

Hydraulic Bala				
Field	Date			
F 10	April 1			
F 11	April 15			
F 15	April 15			
F 16	April 15			
F 18	April 1			
F 19	April 1			
F 2	April 15			
F 20	April 1			
F 21	April 1			
F 22	April 1			
F 23	April 1			
F 24	April 1			
F 25	April 15			
F 3	May 1			
F 4	April 1			
F 5	April 15			
F 6	April 15			
F 7N	April 1			
F 7S	April 15			
F 8	April 1			
F9	April 1			
F1	April 15			
F12	April 1			
F13	April 1			
F14	April 15			
F17	April 1			

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test

Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If

commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keeps a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: F 10 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0	3 (10)	
from Prior Crops	0	361	
from Prior Bio-Nutrients	31		
from Irrigation Water	0		0
Nutrient Balance from above	334.1	85.9	351
Imported Nutrients	56	82	313
Estimated Remaining Nutrients Required	278	4	38
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	278	4	38

Acceptable: Sustainable agronomic rate.

Field: F 11 Crop: Potatoes Yield: 550

	N	P205	K20
Crop Nutrient Requirement	330	76	343
Nutrients From Soil	?		1
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	22		
from Irrigation Water	0	120	0
Nutrient Balance from above	309	75.6	343.2
Imported Nutrients	40	57	220
Estimated Remaining Nutrients Required	269	19	123
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	269	19	123

Acceptable: Sustainable agronomic rate.

Field: F 15 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351

?		
0		
0		
31		
0		0
334.1	85.9	351
56	82	313
278	4	38
0	0	0
278	4	38
	0 0 31 0 334.1 56 278 0	0 0 31 0 334.1 85.9 56 82 278 4 0 0

Acceptable: Sustainable agronomic rate.

Field: F 16 Crop: Wheat-Winter, Irrigated South ID Yield: 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	0		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	150.8	60.5	41.2
Imported Nutrients	45	66	251
Estimated Remaining Nutrients Required	106	-6	-210
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	106	-6	-210

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: F 18 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?	1818	
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	27		
from Irrigation Water	0		0
Nutrient Balance from above	338.6	85.9	351
Imported Nutrients	48	70	268
Estimated Remaining Nutrients Required	291	16	83
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	291	16	83

Acceptable: Sustainable agronomic rate.

Field: F 19 Crop: Potatoes Yield: 550

	N	P205	K20
Crop Nutrient Requirement	330	76	343

Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	22		
from Irrigation Water	0		0
Nutrient Balance from above	309	75.6	343.2
Imported Nutrients	40	57	220
Estimated Remaining Nutrients Required	269	19	123
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	269	19	123

Acceptable: Sustainable agronomic rate.

Field: F2 Crop: Wheat-Winter, Irrigated South ID Yield: 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	0	思禁	
from Prior Bio-Nutrients	24		
from Irrigation Water	0		0
Nutrient Balance from above	152.4	60.5	41.2
Imported Nutrients	42	61	236
Estimated Remaining Nutrients Required	110	-1	-194
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	110	-1	-194

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: F 20 Crop: Wheat-Winter, Irrigated South ID Yield: 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?	ala p	1000
from Mineralized Nitrogen	45		
from Prior Crops	54	R.S	
from Prior Bio-Nutrients	31		
from Irrigation Water	0		0
Nutrient Balance from above	90.6	60.5	41.2
Imported Nutrients	56	82	313
Estimated Remaining Nutrients Required	34	-22	-272
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	34	-22	-272

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: F21 Crop: Potatoes Yield: 550

	N	P205	K20
. 21	學出版。	7.70	(TERM)

Crop Nutrient Requirement	330	76	343
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	22		
from Irrigation Water	0		0
Nutrient Balance from above	309	75.6	343.2
Imported Nutrients	40	57	220
Estimated Remaining Nutrients Required	269	19	123
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	269	19	123

Acceptable: Sustainable agronomic rate.

Field: F 22 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

(1) 12 TO 22	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?	1	
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	31		
from Irrigation Water	0		0
Nutrient Balance from above	334.1	85.9	351
Imported Nutrients	56	82	313
Estimated Remaining Nutrients Required	27/8	4	38
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	278	4	38

Acceptable: Sustainable agronomic rate.

Field: F 23 Crop: Wheat-Winter, Irrigated South ID Yield: 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	0		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	150.8	60.5	41.2
Imported Nutrients	45	66	251
Estimated Remaining Nutrients Required	106	-6	-210
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	106	-6	-210

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: F 24 Crop: Wheat-Winter, Irrigated South ID Yield: 110

		N	P205	K20

Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	0		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	150.8	60.5	41.2
Imported Nutrients	45	66	251
Estimated Remaining Nutrients Required	106	-6	-210
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	106	-6	-210

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: F25 Crop: Wheat-Winter, Irrigated South ID Yield: 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	0		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	150.8	60.5	41.2
Imported Nutrients	45	66	251
Estimated Remaining Nutrients Required	106	-6	-210
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	106	-6	-210

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: F3 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

N	P205	K20
364	86	351
?		
0		
0		
31		
0		0
334.1	85.9	351
56	82	313
278	4	38
0	0	0
278	4	38
	? 0 0 31 0 334.1 56 278	364 86 ? 0 0 31 0 334.1 85.9 56 82 278 4 0 0

Acceptable: Sustainable agronomic rate.

Field: F4 Crop: Wheat-Winter, Irrigated South ID Yield: 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	0	英語	
from Prior Bio-Nutrients	24		
from Irrigation Water	0		0
Nutrient Balance from above	152.4	60.5	41.2
Imported Nutrients	42	61	236
Estimated Remaining Nutrients Required	110	-1	-194
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	110	-1	-194

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: F 5 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	31		
from Irrigation Water	0		0
Nutrient Balance from above	334.1	85.9	351
Imported Nutrients	56	82	313
Estimated Remaining Nutrients Required	278	4	38
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	278	4	38

Acceptable: Sustainable agronomic rate.

Field: F 6 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	31		
from Irrigation Water	0		0
Nutrient Balance from above	33 <u>4.1</u>	85.9	351
Imported Nutrients	56	82	313
Estimated Remaining Nutrients Required	278	4	38
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	278	4	38

Acceptable: Sustainable agronomic rate.

Field: F 7N Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	27		
from Irrigation Water	0		0
Nutrient Balance from above	338.6	85.9	351
Imported Nutrients	48	70	268
Estimated Remaining Nutrients Required	291	16	83
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	291	16	83

Acceptable: Sustainable agronomic rate.

Field: F 7S Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?	1000	
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	31		
from Irrigation Water	0		0
Nutrient Balance from above	334.1	85.9	351
Imported Nutrients	56	82	313
Estimated Remaining Nutrients Required	278	4	38
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	278	4	38

Acceptable: Sustainable agronomic rate.

Field: F 8 Crop: Potatoes Yield: 550

	N	P205	K20
Crop Nutrient Requirement	330	76	343
Nutrients From Soil	?	185 H	
from Mineralized Nitrogen	0	V.53	
from Prior Crops	0		
from Prior Bio-Nutrients	22	25%	
from Irrigation Water	0		0
Nutrient Balance from above	309	75.6	343.2
Imported Nutrients	40	57	220
Estimated Remaining Nutrients Required	269	19	123
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	269	19	123

Acceptable: Sustainable agronomic rate.

Field: F 9 Crop: Wheat-Winter, Irrigated South ID Yield: 110

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Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	0		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	150.8	60.5	41.2
Imported Nutrients	45	66	251
Estimated Remaining Nutrients Required	106	-6	-210
Commercial Fertilizer Application	. 0	0	0
Final Nutrient Balance	106	-6	-210
	The Street of Street	900-1	

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: F1 Crop: Wheat-Winter, Irrigated South ID Yield: 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	0		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	150.8	60.5	41.2
Imported Nutrients	45	66	251
Estimated Remaining Nutrients Required	106	-6	-210
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	106	-6	-210

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: F12 Crop: Wheat-Winter, Irrigated South ID Yield: 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	0		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	150.8	60.5	41.2
Imported Nutrients	45	66	251
Estimated Remaining Nutrients Required	106	-6	-210
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	106	-6	-210

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: F13 Crop: Potatoes Yield: 550

	N	P205	K20
Crop Nutrient Requirement	330	76	343
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	22		
from Irrigation Water	0		0
Nutrient Balance from above	309	75.6	343.2
Imported Nutrients	40	57	220
Estimated Remaining Nutrients Required	269	19	123
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	269	19	123

Acceptable: Sustainable agronomic rate.

Field: F14 Crop: Wheat-Winter, Irrigated South ID Yield: 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	0		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	150.8	60.5	41.2
Imported Nutrients	45	66	251
Estimated Remaining Nutrients Required	106	-6	-210
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	106	-6	-210

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: F17 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	31		
from Irrigation Water	0		0
Nutrient Balance from above	334.1	85.9	351
Imported Nutrients	56	82	313
Estimated Remaining Nutrients Required	278	4	38
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	278	4	38

Acceptable: Sustainable agronomic rate.

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	Amount	Consumer	Consumer's Address	Telephone	Acres
No nutrients are exported from this facility			= 200		

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: F 10

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimi/ phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Rating: Very Low or N.A. Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Rating: Medium Manure Phosphorus Application Rate

Manure Application Rate: 81.6

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 11

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P

Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Rating: Very Low or N.A.

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 57.3

Rating: Medium

Rating: Very High

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 15

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P

Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 81.6

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 16

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary

soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 30

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 65.5

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of tifield

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 18

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Rating: Very Low or N.A.

Rating: Very High

Rating: Medium

Rating: High

Rating: Very Low or N.A.

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 69.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations).

A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 19

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Rating: High

Manure Application Rate: 57.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by

disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this

field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 2

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 30

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 61.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Rating: High

Rating: Low

Rating: Very High

Rating: Very Low or N.A.

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this

field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 20

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 30

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Rating: Very Low or N.A.

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 81.6

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations).

A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Surface Irrigation or Overhead Irrigation

Comments: No Data

Rating: Very High

Rating: Low

Rating: Very Low or N.A.

Rating: Very Low or N.A.

Rating: Very High

Rating: Medium

Rating: High

Runoff Best Management Practices

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this

field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 21

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 57.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basis, should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 22

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 30

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 81.6

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Rating: Very Low or N.A.

Rating: Very High

Rating: Medium

Rating: High

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Rating: Low

Comments: No Data

Runoff Best Management Practices

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Rating: Very High

FIELD: F 23

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 65.5

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Rating: Very Low or N.A.

Rating: Very Low or N.A.

Rating: Very High

Rating: Medium

Rating: High

Surface Irrigation or Overhead Irrigation

Comments: No Data

Runoff Best Management Practices

Rating: Low

Rating: Very Low or N.A.

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this

field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 24

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Rating: Medium

Rating: High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 65.5

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

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Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 25

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Rating: Very High

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 65.5

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Rating: Medium

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 3

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 81.6

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Surface Irrigation or Overhead Irrigation

Comments: No Data

Runoff Best Management Practices

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F4

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Rating: High

Rating: Very High

Rating: Medium

Rating: Very Low or N.A.

Rating: Very Low or N.A.

Rating: Very High

Rating: Low

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 30

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is

successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 61.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this

field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 5

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimi phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P

Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 30

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 81.6

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 6

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Rating: Very High

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 81.6

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Comments: No Data

Rating: Very Low or N.A.

Rating: Low

Rating: Very High

Runoff Best Management Practices

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 7N

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P

Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Rating: Very High

Rating: Medium

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 69.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

Rating: High

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 7S

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 30

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 81.6

Rating: Medium

Rating: High

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Surface Irrigation or Overhead Irrigation

Comments: No Data

Rating: Very Low or N.A.

Rating: Very Low or N.A.

Rating: Low

Rating: Very High

Runoff Best Management Practices

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F8

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

Rating: Very Low or N.A.

Rating: Very High

Rating: Medium

Rating: High

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 57.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations).

A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water

balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this

field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F9

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Rating: Critical

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 65.5

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

Rating: Very High

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins

should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F1

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 30

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Rating: Very High

Rating: Medium

Rating: High

Rating: Very Low or N.A.

Manure Phosphorus Application Rate

Manure Application Rate: 65.5

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Rating: Very High

Rating: Very Low or N.A.

Rating: Medium

Rating: High

FIELD: F12

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 65.5

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Rating: Very Low or N.A.

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this

field

Distance to Surface Water Body

Rating: Very High

Rating: Medium

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F13

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is suggestful in reducing soil P levels.

successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application MethodRating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 57.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

Rating: High

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basing should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F14

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 30

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Rating: Very High

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 65.5

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Rating: Medium

Rating: High

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Rating: Very High

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F17

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 30

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Rating: Very Low or N.A.

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 81.6

Rating: Medium

Rating: High

Rating: Very High

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Surface Irrigation or Overhead Irrigation

Comments: No Data

Rating: Very Low or N.A.

Rating: Very Low or N.A.

Rating: Low

Rating: Very High

Runoff Best Management Practices

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long term sustainability of this

field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: F 10

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 11

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 15

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 16

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 18

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as

uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 19

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 2

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 20

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this

field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 21

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 22

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 23

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 24

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, the field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 25

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 3

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 4

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity

(EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 5

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 6

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Rating: Medium

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 7N

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and

appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 7S

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, the field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 8

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F9

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth

needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F1

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F12

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F13

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop

yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F14

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F17

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

NUTRIENT RISK ANALYSIS Legend

_ <u>J</u>	BMP	Definition	Purpose
]	Buffer Strip	Contour buffer strips arperennialof perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
(Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.

Chiseling and Subsoiling

Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.

To improve water and root penetration and aeration.

Composting Facility

A composting facility is installed for biological stabilization of waste organic material. The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.

Conservation Cover

This practice involves establishing and maintaining a protective cover of perennial vegetation on land retired from agriculture production.

This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or enhances wildlife habitat.

Conservation Cropping Sequence

Growing crops in a recurring sequence on the same field.

This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.

Contour Farming

Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)

To reduce erosion and control water.

Cover and Green Manure

A crop of close-growing, legumes,

To control erosion during periods

Crop

or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.

when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.

Critical Area Planting

Planting vegetation on critically eroding areas that require extraordinary treatment.

This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized planting techniques and management.

Dike or Berm

An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.

Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.

Diversion

A channel constructed across the slope with a supporting ridge on the lower side.

To divert excess water from one area for use or safe disposal in other areas.

Drip Irrigation

A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, and perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.

To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation. Filter Strip

A strip or area of vegetation for removing pollutants water.

A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.

Fish Stream Improvement

Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.

The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.

Grade Stabilization Construction

A structure used to control the grade and head cutting in natural or artificial channels.

These structures are to: Stabilize the grade and control erosion in natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.

Grassed Waterway

A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.

Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.

Grazing Land Mechanical Treatment Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling. This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.

Heavy Use Area Protection

Protecting heavily used areas by establishing vegetative cover, by

To stabilize urban, recreation, or facility areas frequently and

surfacing with suitable materials, or by installing needed structures.

intensely used by people, animals, or vehicles.

Irrigation Land Leveling

Reshaping the surface of land to be irrigated to planned grades.

To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.

Irrigation Water Management Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.

Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion; Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.

Mulching

Applying plant residues or other suitable materials not produced on the site to the soil surface.

To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.

Polyacrylamide (PAM)

Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.

Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.

Prescribed Grazing

Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.

Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to: 1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away

from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.

Residue Management (Conservation Tillage)

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.

This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.

Riparian Forest Buffer

A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.

The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.

Sediment Basin

A basin constructed to collect and store debris or sediment.

A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

Sprinkler System

A planned irrigation system in

To efficiently and uniformly apply

which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.

irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.

Stream Channel Stabilization

Stabilizing the channel of a stream with suitable structures.

To control aggradations or degradation in a stream channel.

Stream bank Protection

Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion. To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel. Control channel meander that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.

Strip-cropping, Contour

Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or closegrowing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.

To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.

Strip-cropping, Field

Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a closegrowing crop is alternated with a clean-tilled crop or fallow.

To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.

Subsurface Drains

A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion,

ground surface to collect and/or convey drainage water.

Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.

Surge Irrigation

Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.

Surge allows a lighter application of water with a higher efficieciency. The result is less deep percolation of water at the upper end of the field and a more uniform application.

Tailwater Recovery & Pumpback System

A facility to collect, store, and transport irrigation tailwater for reuse in a farm irrigation distribution system. To conserve farm irrigation water supplies and water quality by collecting the water that runs off the field surface for reuse on the farm.

Terraces

An earth embankment, a channel, or a combination ridge and channel constructed across the slope.

Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.

Use Exclusion

Excluding animals, people or vehicles from an area.

To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.

Water and Sediment Control Basin An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.

To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.

Watering Facility

A device (tank, trough, or other watertight container) for providing

To provide watering facilities for livestock and/or wildlife at selected

animal access to water.

locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.

Wetland Development/Restoration The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland. To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S. Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculate the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils

contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0- to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct an S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes, and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops would have sufficient residual for alfalfa.

BORON

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do not use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the regrowth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition. Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however. Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage. Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

Potatoes NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Most Idaho potato fields will respond to fertilizer nitrogen (N). The N rate used, along with other management factors, particularly irrigation, can have a marked effect on the yield and quality of the potato crop.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical potato yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management.

Projected changes in crop management (i.e. improved variety, better disease and weed control) designed appreciably increase production may require adjustment of yield potential upward.

Research has shown that the available N required to produce a good potato yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date

and soil type can influence the N required by potatoes for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates. MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in preplant soil samples and thus contributes little to available N. However, it can be as high as or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition.

Consequently, these residues have little effect on the N needs of potatoes.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which potatoes are grown rarely receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should

adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to potatoes. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system. Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Type limitations of this practice are that (1) the application of the N with this method may not be as uniform a desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =

(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizer recommendations are for Russet Burbank potatoes grown on sandy loam soils. Adjustments are made for very sandy soils (add 30 lb N/acre) and silt loam soils (subtract 40 lb N/acre) to account for differences in nitrogen mineralization rates and nitrogen use efficiency. To maximize yield and quality, growers should aim to have about 40 to 45% of their total N supply applied by row closure. Nitrogen applications made during tuber bulking should be guided by petiole sampling to maintain at least 15,000 ppm N03-N in the fourth petiole from the growing tip.

Excess levels of soil N at or before tuberization can delay tuber growth, reduce yields and lower tuber specific gravity. Excess N in late summer and fall can delay maturity of the tubers. This delayed tuber maturity can adversely affect tuber storability and quality.

The N needs of the potato crop are best met by split-application of N fertilizer. This involves applying low rates of N fertilizer preplant and at planting, with the remainder of the crop's N needs applied with the irrigation water. Some cropping systems - for example, furrow irrigation - make it difficult to apply N fertilizer and get efficient plant uptake. Under these conditions most of the crop N needs are applied to the soil before planting.

Nitrogen applied with irrigation water is an effective way to supplement the crop during the growing season. Do not use aqua or anhydrous ammonia in sprinkler system applications. Applications through a sprinkler system are not folar fertilization.

PHOSPHORUS

Potato plants need phosphorus (P) for plant growth and will respond to P fertilizer if the soil test concentration is low. Phosphorus soil test for potatoes is based on an extraction with sodium bicarbonate. Soil samples for a phosphorus soil test should be taken from 0- to 12-inch depths. This depth of sampling is critical to achieve an accurate soil test P level. Deviation in sampling depth from the 12-inch depth may drastically alter soil test results.

Phosphorus is immobile in soil and therefore does not move from where it is placed. Applied P fertilizer must be mixed into the seedbed before planting for best results. Banding P fertilizer along side plants has not been as effective as P fertilizer that has been broadcast and incorporated. Eroded or scraped areas, commonly referred to as "white soil" areas, may be low in available P because of its high content of "free lime." These areas should be tested and fertilized separately. To compensate for low P availability when free lime is present in the soil, rates of P are increased with increasing levels of free lime. Total phosphorus concentrations should be kept above 0.22% in the fourth petiole during tuber bulking.

POTASSIUM

Potatoes require high levels of available potassium (K). Potassium is relatively immobile in the soil. For best results, K fertilizers should be applied preplant and mixed into the seedbed. Banding beside the plants has

been used successfully but is not as effective as K fertilizer which has been broadcast and incorporated. Potassium fertilizer applications reduce specific gravity of harvested tubers. Potassium chloride fertilizer (KCl or muriate of potash) lowers specific gravity of tubers more than potassium sulfate fertilizer (K2SO4 or sulfate of potash). Growers should avoid over-fertilization of potatoes with K fertilizers. When specific gravity of tubers is important, potassium sulfate is the preferred K fertilizer source. Total potassium concentrations should be kept above 7.0% in the fourth petiole during tuber bulking.

SULFUR

Potatoes generally do not respond to sulfur (S) fertilization. Sulfur response is most likely to occur in sandy soils and in areas where irrigation water sources are low in S. Water low in S includes mountain streams and some well waters. The more irrigation return-flow in the water source the greater the amount of dissolved, plant-available sulfate (S04) form. Elemental sulfur is not recommended because it is not immediately available to plants. Elemental sulfur will require several months from time of application until it is converted to plant-available form.

MICRONUTRIENTS

"Shotgun" application of micronutrients - I.e. complete mixes containing boron (B), copper (Cu), iron (Fe), manganese (Mn) and zinc (Zn) - "for insurance" are not recommended since these elements have not been shown to give an economical response. Soil tests for individual micronutrients are available and concentrations in the 0- to 1-inch soil sample are: B = 0.5 ppm, Cu = 0.2 ppm, Fe = 4.0 ppm, Mn = 2.0 ppm, Zn = 0.5 ppm. Critical concentrations represent values below which a response from the application of that micronutrient may be obtained.

Zinc deficiencies have not been widespread on potatoes although some crops in certain areas of southern Idaho do show a Zn deficiency. When the soil test for Zn is below the critical concentration or where land leveling or erosion has exposed white subsoil containing free lime, apply Zn fertilizer at a rate which will supply 10 pounds of Zn per acre or equivalent. This amount of Zn should be sufficient for 4 to 6 years of crop production.

GENERAL COMMENTS

The P, K, and Zn nutritional status of the plant should also be monitored during the growing season. The same petiole sample used for N03-N concentrations can also be used for this purpose. Guidelines for adequate concentrations of these and other nutrients in the petiole can be obtained from your county agricultural Extension agent, consultant, or fieldman.

Fertilizer materials containing P, K and Zn should be thoroughly incorporated into the root zone. These materials can be effectively applied in the fall.

Sugar beets NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Controlling the amount of N available to the sugar beet is critical in producing high beet tonnage with high sugar percentage. Nitrogen in excess can reduce sugar percentage and gross income per acre.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical sugar beet yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season)

inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates. MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. Soils that retain moisture tend to mineralize more N than soils such as sandy loams, which dry out more rapidly. Mineralization of N is limited by cooler soil temperatures that limit soil biological activity.

While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized. INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Accurate soil sampling and analysis in a high value crop like sugar beets is one of the best investments that can be made and is highly recommended. A soil test measures the residual N carryover from the previous crop and provides the necessary information for accurate fertilizer application. Nitrate nitrogen (NO3-N) is mobile in the soil. Soil samples, therefore, should be taken from the 0- to 12-inch and 12- to 24-inch soil depths or the effective root zone. These depths should be sampled and kept separate for analysis. If the first foot is low in N (less than 5 ppm) but the sum of the first 2 feet is adequate, 20 to 40 pound sof N per acre may be applied to provide N until root growth is sufficient to reach the N in the second foot (about 4 to 5 weeks after emergence).

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Non-cereal residues (potatoes, sugar beets, onions, beans, mint, and sweet corn) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of sugar beets. Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop sease that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Very few soils used for sugar beets receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre fee water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per

acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to sugar beets. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system. Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs whilside dressed sidedressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =

(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test)
(previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizers can be fall applied on loam, silt loam, and clay soils. Winter leaching of N from the soil profile can be reduced to a minimum by applying N in the ammonium or urea forms when soil temperature is below 45 F. Greater efficiency may be obtained from preplant application in spring or by side dressing before July 1. Nitrogen applied after July 1 stimulates vegetative growth, lowers sugar percentage and extractability and contributes little to total sugar yield.

On sandy soils where over-irrigation and leaching of nitrogen are likely, side dressing or applications of nitrogen through irrigation water before July 1 are suggested for at least half of the rate used. Split N applications often increase nitrogen use efficiency, sugar beet tonnage, and sugar production. Research conducted at the Kimberly R & E Center during 1992-1994 showed that split N fertilization generally increased estimated recoverable sugar and net economic return/acre compared to applying all N preplant. However, growers need to avoid applying significant amounts of N late in the growing season, which can stimulate top growth at the expense of sugar production.

The practice of placing starter fertilizer with the seed is not recommended because it will reduce germination and result in poor stands.

PHOSPHORUS

Sugar beets will respond to P fertilizer if soil test levels are low. The soil test is based on extractable P present in the upper 12 inches of the soil.

Phosphorus should be plowed down or applied to rough-plowed ground and worked into the seedbed. High rates should not be placed with or immediately below the seed. Side dressing is recommended when late applications are necessary.

POTASSIUM

Sugar beets require less K than potatoes or alfalfa but will respond to K fertilization if soil test levels are low. The soil test is based on the extractable K present in the upper 12 inches of the soil. Potassium should be incorporated into the seedbed.

MICRONUTRIENTS

Deficiencies of Zn are not widespread in sugar beets. When the soil test for Zn is below 0.6 ppm in the upper 12 inches of the soil, or where land leveling has exposed white, limey subsoil, apply Zn fertilizer at a rate that supplies 10 pounds of zinc per acre or equivalent.

"Shotgun" applications of micronutrient mixtures "for insurance" have not been necessary or economical; therefore, they are not recommended.

SULFUR

Sulfur is generally not deficient in the major sugar beet-growing region of Idaho where the Snake River is the source of irrigation water. In areas known to be S deficient or where the soil test is less than 8 ppm in the 0- to 12-inch soil sample, apply 30 pounds S per acre.

GENERAL COMMENTS

Uniform plant populations (110 to 130 plants per 100 feet of row) after thinning have produced the highest root yields and sugar percentages.

Wheat-Winter, Irrigated South ID NITROGEN

Adequate nitrogen is necessary for maximum production of irrigated wheat. Nitrogen represents, by far, the largest share of fertilizer costs for wheat in Idaho. The amount of nitrogen required depends on many factors which influence total wheat production and quality. Both yield potential and available nitrogen (N03 = NH4) should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical wheat yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward.

Research has shown that the available N required to produce a bushel of irrigated wheat depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by wheat for maximum yield. The results of irrigated field trials in the Boise and Magic valleys suggest as a rule that 2 pounds available N per bushel of wheat is required for maximum production up to 120 bushels per acre. Above 120 bushels per acre, the factor is somewhat less than two.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates. MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in preplant soil samples and thus contributes little to available N. However, it can be as high as or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications.

A preplant soil sample is often only collected from the first foot of soil. Although this information is not as complete and reliable as would be provided by deeper sampling, residual N measurements from the first foot of soil can be combined with estimates of residual N in the second foot to predict N requirements for irrigated winter wheat. For fall planted winter cereals in western Idaho, preplant soil test N03-N in the second foot of the soil is commonly only one-half to two-thirds as high as in the first foot of soil. However, this estimate may not be accurate after potatoes or other sprinkler irrigated crops, especially in coarser textured soils. Basing N rate recommendations on estimates of residual N in the second foot increases the risk of recommending either too little or too much N.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition.

Consequently, these residues have little effect on the N needs of winter wheat.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which winter wheat is grown occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciable depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to winter wheat. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system. Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =

(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - Irrigation Water

TIMING OF NITROGEN APPLICATION

Excessive irrigation or heavy winter precipitation can result in leaching of nitrate N beyond the root systems. This hazard exists on all soils, but particularly on coarse textured soils such as sands, and sandy loams. Fall pre-plant N was once thought to be as good or preferable to spring top dressed N in calcareous silt loam or clay soils in areas of low rainfall. However, even under these conditions, southern Idaho research has show than N applied in late winter or early spring is frequently used more effectively than early fall preplant applied N.

Nitrogen fertilizers containing ammonium (ammonium sulfate, anhydrous or aqua ammonia, or urea) are less subject to leaching losses when lower soil temperatures (less than 40 F) inhibit the microbial conversion of ammonium to nitrate. Lower temperatures also reduce the microbial activity that is responsible for the immobilization of applied N. Late fall, split, or spring applied N is also recommended when residues from previous grain or mature corn crops are returned to the soil in early fall.

Early spring N applications are more effective for increasing grain protein for irrigated hard red winter wheat. Nitrogen applied after the boot stage will contribute more to grain protein than to yield. Most wheat varieties respond in a similar way to N. However, varieties differ in their tolerance of high N rates. High N contributes to lodging of varieties with poor straw strength.

PHOSPHORUS (P)

Wheat requires little phosphorus compared to the P requirements of other crops although minimum soil levels are necessary for maximum production. Adequate P is especially necessary for winter hardiness. Soil tests can indicate whether soils require phosphorus fertilization for maximum wheat production. Soil samples are taken from the 0- to 12-inch depth.

Broadcast lowdown, broadcasts seedbed incorporation or drill banding low rates of P with seed are effective methods of application. Drill banding may reduce the fertilizer P required. Drill banding high rates of P, especially ammonium phosphate fertilizers, can cause seedling damage. For more detailed discussion of banding, refer to PNW 283, "Fertilizer Band Location for Cereal Root Access."

POTASSIUM (K)

Wheat has a lower requirement for K compared to sugar beets, corn or potatoes. Soil tests can be useful indicators of the need for K. Potassium should be incorporated during seedbed preparation.

SULFUR (S)

Sulfur requirements for wheat will vary depending on soil texture, previously incorporated crop residues, leaching losses, S content of irrigation water and S soil test. Wheat irrigated with Snake River water should not experience S shortages. Soils low in S (less than 10 ppm S04-S in the plow layer or 8 ppm in the 0- to 12-inch depth) should receive 20 to 40 pounds of S per acre.

Sulfur deficiency appears as a general yellowing of the plant early in the season and looks much like N deficiency. Plant analysis can be a useful means of differentiating between the two deficiencies. An N to S ratio of 17 in whole plant tissues is generally used for diagnosing sulfur deficient wheat. Sulfur deficient wheat has also been known to contain high nitrate nitrogen (N03-N) concentrations.

MICRONUTRIENTS

Micronutrients have not been shown to be limiting wheat production and "shotgun" application of micronutrient mixtures containing boron, manganese, iron and copper "for insurance" have not been shown to be responsive and are not suggested.

GENERAL COMMENTS

Avoid a heavy first irrigation on spring cereals to prevent water logging, reduced tailoring and N leaching.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites

where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:
 - 1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.
 - 2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.

3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data Date of Test: No Data

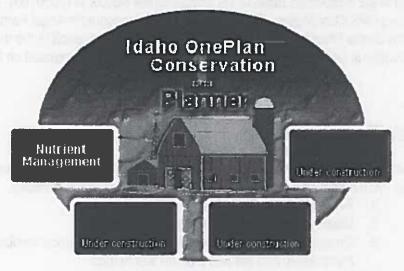
Field: No Data	Date of	f Test:	No Data	
Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	20.11
E <i>C</i>	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
Р	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	ELL I
Mn	ppm	No Data	No Data	=
Fe	ppm	No Data	No Data	
Сц	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

6

Grandview Angel Farm

Nutrient Management Plan

Agriculture . . . Launching into the Future



Nutrient Management Plan Prepared For:

Grandview Farms (208) 834-2231 Angel Farm

Certified Planner:

Michael Mitchell Professional Engineer, EAC Engineering, Inc (559) 381-0607

Producer Signature:	Certificated Planner Signature:	
	Date Completed: 10-02-07	

The information provided by those using the "Idaho OnePian" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27.17D6)

ANGEL FARM Producer Summary

Farm Summary

Angel Farm is an existing farm located 1.8miles North of Grandview, Idaho. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of three pivot irrigated fields and one furrow irrigated field for a total of 525.3 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot.

Farm Resource Concerns

Angel Farm is located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 01'43" 42N 58'27" using GPS Coordinates. The primary resource concern for Angel Farm is ground water quality. The farm sits along the Snake River however fields are bermed to prevent runoff to the river therefore runoff is not likely to occur. Solid waste is applied to all of the fields and pasture and incorporated on fields within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

- 1. Fertilizer application rates
- 2. Manure/Compost application rates
- 3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
- 4. Fields to which the nutrients are applied
- 5. Spring soil test for nitrogen (required annually) 0-12" and 12-24" nitrogen test

Crop Nutrient R	equirement
Crop	Pounds of P205 per acres
Alfalfa	86
Wheat	66
Sugarbeets	48

Manure/Compost field application requirement (tons)											
Acres X crop nutrient requirement + manure p205 value* = Tons required											
Example	Corn - 250(acres)	Χ	75 (crop requirement)	÷ 16.85							
Corn	250	Х	75** = 18750	+ 16.85* = 1112.76 tons							

^{*}based on manure test values for P205

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate

^{**}pounds of p205 required per acre

conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas
 of very shallow soils, and sinkholes.

Angel Farm ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

- 1) assure proper containment of animal manure and process waste water
- 2) assess resource concerns which exist on the property
- 3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.
- 4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO,) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue). Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1): Grandview Angel Farm

Address: 1301 Hwy 67, Grandview, ID 83624

Phone: (208) 834-2231 N/A

N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation

District:

Bruneau River

County:

Elmore

Watershed Basin:

Middle Snake-succor (USGS Hydrologic Unit Code #

17050103)

ANALYSIS OF RESOURCE CONCERNS

Angel Farm is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES		CHAN STAB		FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G		PEST	PH	SAL	SED	TDG	TEMP	UNKN	٠
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	X

Angel Farm is <u>not</u> located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

<u>Priority 1</u> is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

<u>Priority 2</u> is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Angel Farm is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

• Surface Water - Surface water has water quality standards based on the designated use of the water body. These water quality standards must be met or the water body is listed as water quality impaired and falls under the TMDL process. Good irrigation and nutrient management practices will help keep nutrients available for crop use and decrease the nutrient loading into surface water.

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Field 10	Cobbles	13
	Water Table	>72
Field 11	Cobbles	13
	Water Table	36
Field 12	Cobbles	13
	Water Table	36
Field 9	Water Table	>72

Well Testing Results (See back of page):

V	Vell	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
	No	No	No Data	No	No	No	No	No	No Doto	No Data	No Doto	No Data
	Data	Data	No Data	Data	Data	Data	Data	Data	No Data	No Data	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the

Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Thresh hold Soil Test Depth
Field 10	Groundwater < 5'	20	18 - 24"
Field 11	Groundwater < 5'	20	18 - 24"
Field 12	Groundwater < 5'	20	18 - 24"
Field 9	Groundwater >=5'	30	18 - 24"

Farm Location

 $\frac{Idaho\ Transverse\ Mercator}{Coordinates\ of\ the\ farm\ center\ (meters):\ X=2334374.03196465,\ Y=1310156.02484453}$ Map Scale: 1:236



Figure 1. Base Map

Farm Location

 $\frac{Idaho\ Transverse\ Mercator}{Coordinates\ of\ the\ farm\ center\ (meters):\ X=2334374.03196465,\ Y=1310156.02484453}$ Map Scale: 1:236

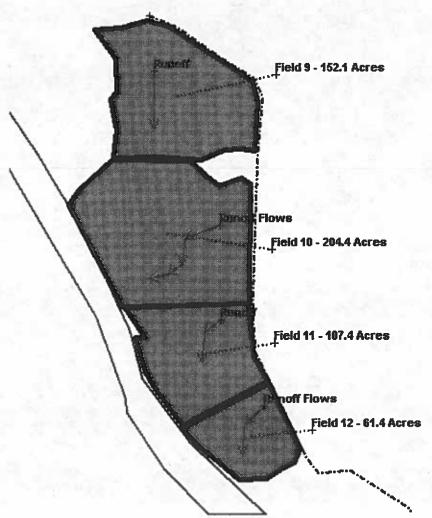


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: Field 10

Name	Man App		Imported Nutrien	Mine	ralization	Т	otal
		Γ	4-Trac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	50	N	0	Ν	50
	1	P	73			P	73
·		ĸ	279			N 5 P 7 K 21 N 15 P 7 K 21 N 4 P 7 K 21 N 7	279
	!	Γ	4{T/ac			7	
Wheat-Spring, Irrigated South ID(2005)	Y	N	50	N	107	Z	157
ram oping ought and a control		P	73			P	73
		ĸ	279			N 5 P 7 K 2: N 4 P 7 K 2: N 2:	2 7 9
			4 Trac	pr. 1000			
Potatoes(2006)	Y	N	50	N	-10	N	40
		P	73		121-1	P	73
		ĸ	279	2	200	κ	279
			4 Trian			ir.	
Potatoes(2006) Ifalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	Z	50	N	28	Z	78
	,	P	73			P	73
		K	279		1	ĸ	279

FIELD: Field 11

Name	Мап Арр		Imported Nutrient	Miner	alization	T	otal
		Γ	410/ab			-	Г
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	51	N	0	2	51
		P	73			P	73
		ĸ	281			N P K K	28
			4 The				
Sugarbeets(2005)	Y	N	51	N	93	Z	14
		P	73			P	73
		ĸ	281			κ	28
			4PT/ac				Г
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	51	N	28	N	79
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		P	73		1975	P	73
		K	281			К	28
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)			4 T/ac				Γ
	Y	Z	51	N	28	7	75
		P	73			P	73
- 1	-	K	281	德		N P K 2 N P K 2 N N N N	28

FIELD: Field 12

Name	Мал Арр	٠	Imported Nutrient	Mine	ralization	τ	otal
		Γ	ATT/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	52	N	0	N	52
· · · · · · · · · · · · · · · · · · ·	-	P	76			P	76
		K	291		17	ĸ	291
			4'Dec			Γ	
Wheat-Winter, Irrigated South ID(2005)	Y	N	52	N	128	N	180
	1	P	76			P	76
		ĸ	291			ĸ	29
			4/T/ac			Γ	
Aifalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	52	N	-9	N	43
1	, i	P	76	100		P	76
		Ķ	291			к	29
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006) Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)		Γ	4°D/ac				Г
	_Y	N	52	N	29	N	81
	-	P	76		1	P	76
		K	291	1		K	291

FIELD: Field 9

Name	Man Ap	P	Imported Nutrient	Miner	alization	T	otal
		T	STrac				Г
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	56	N	0	N	56
		P	80			P	80
		ĸ	308			K	308
		Τ	STriec				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	l v	N	56	N	31	N	87
		P	80			P	80
		K	308			N I P I K 3	308
			5 This				
275 775 pg 275 275 200	Y	N	56	N	31	N	87
,		P	80	(4)		P	BO
		K	308	1		K	308
		Γ	5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	_Y	Z	56	N	31	N	87
,		P	80			P	80
falfa Hay, Irrigated South ID-Cut Manure(2006) Ifa Hay, Irrigated South ID-Cut Mid Bloom(2007)		ĸ	308	23	禁疫	к	308

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	440

The acreage in the table is based on an average crop uptake of 100 lbs P₂O₅ per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Division of Animal Industries.

Hydraulic Balance

Field	Date
Field 10	April 15
Field 11	May 1
Field 12	May 1
Field 9	April 1

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test

Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keeps a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Field 10 Crop: Wheat-Spring, Irrigated South ID Yield: 120

	N	P205	K20
Crop Nutrient Requirement	240	66	45
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	34		
from Prior Bio-Nutrients	28		
from Irrigation Water	0		0
Nutrient Balance from above	134	66	44.9
Imported Nutrients	50	73	279
Estimated Remaining Nutrients Required	84	-7	-234
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	84	-7	-234

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: Field 11 Crop: Sugarbeets Yield: 35

N	P205	K20
290	48	118
?	N WE	
0		
65		
28		
0	13	0
197.8	48.1	117.6
51	73	281
147	-25	-163
0	0	0
147	-25	-163
	290 ? 0 65 28 0 197.8 51 147	290 48 ? 0 65 28 0 197.8 48.1 51 73 147 -25 0 0

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: Field 12 Crop: Wheat-Winter, Irrigated South ID Yield: 120

	N	P205	K20
Crop Nutrient Requirement	240	66	45
Nutrients From Soil	?	0280	
from Mineralized Nitrogen	45		
from Prior Crops	54		

from Prior Bio-Nutrients	29		
from Irrigation Water	0		0
Nutrient Balance from above	112.9	66	44.9
Imported Nutrients	52	76	291
Estimated Remaining Nutrients Required		-10	-246
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	61	-10	-246

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: Field 9 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	31		
from Irrigation Water	0		0
Nutrient Balance from above	334.7	85.9	351
Imported Nutrients	56	80	308
Estimated Remaining Nutrients Required	280	6	43
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	280	6	43

Acceptable: Sustainable agronomic rate.

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	Amount	Consumer	Consumer's Address	Telephone	Acres
No Data	No Data	No Data	No Data	No Data	No Data

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Field 10

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 72.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Comments: No Data

Rating: Very Low or N.A.

Rating: Low

Rating: Very High

Rating: Very Low or N.A.

Rating: Very High

Rating: Medium

Runoff Best Management Practices

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 11

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 73.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3", by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

Rating: High

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

uno mora

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 12

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Rating: Very High

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 75.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific

Rating: Medium

Rating: High

Rating: Low

Rating: Very High

Rating: Very Low or N.A.

Rating: Very Low or N.A.

Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P

levels.

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Surface Irrigation or Overhead Irrigation

Comments: No Data

Runoff Best Management Practices

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 9

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 30

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test

soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 80.1

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Rating: Medium

Distance to Surface Water Body: 0.2

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Field 10

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 11

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop

growth needs.

Irrigation Efficiency

Comments: No Data

Rating: Very Low or N.A.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 12

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth

epth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 9

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

NUTRIENT RISK ANALYSIS Legend

ВМР	Definition	Purpose	
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.	
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.	(
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.	
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.	
Conservation Cover	This practice involves establishing and maintaining a protective cover of perennial vegetation on land	This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or	(

retired from agriculture production.

enhances wildlife habitat.

Conservation Cropping Sequence

Growing crops in a recurring sequence on the same field.

This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.

Contour Farming

Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)

To reduce erosion and control water.

Cover and Green Manure Crop

A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.

To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.

Critical Area Planting

Planting vegetation on critically eroding areas that require extraordinary treatment.

This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe

gullies requiring specialized planting techniques and management.

Dike or Berm

An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.

Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.

Diversion

A channel constructed across the slope with a supporting ridge on the lower side.

To divert excess water from one area for use or safe disposal in other areas.

Drip Irrigation

A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.

To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.

Filter Strip

A strip or area of vegetation for removing pollutants water.

A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.

Fish Stream Improvement

Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.

The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.

Grade Stabilization

A structure used to control the

These structures are to: Stabilize

)	Construction	grade and head cutting in natural or artificial channels.	the grade and control erosion in natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.
	Grassed Waterway	A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.	Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.
)	Grazing Land Mechanical Treatment	Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.	This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.
	Heavy Use Area Protection	Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.	To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.
	Irrigation Land Leveling	Reshaping the surface of land to be irrigated to planned grades.	To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.

Irrigation Water Management Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.

Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize

irrigation induced soil erosion;
Decrease non-point source
pollution of surface and
groundwater resources; Manage
salts in the crop root zone; Manage
air, soil, or plant micro-climate.

Mulching

Applying plant residues or other suitable materials not produced on the site to the soil surface.

To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.

Polyacrylamide (PAM)

Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water. Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.

Prescribed Grazing

Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.

Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to:
1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.

Residue Management (Conservation Tillage)

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.

This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.

Riparian Forest Buffer

A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.

The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.

Sediment Basin

A basin constructed to collect and store debris or sediment.

A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

Sprinkler System

A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.

To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.

Stream Channel Stabilization

Stabilizing the channel of a stream with suitable structures.

To control aggradation or degradation in a stream channel.

Stream bank Protection

Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion. To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks,

Maintain the capacity of the channel, Control channel meander that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.

Strip-cropping, Contour

Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or closegrowing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.

To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.

Strip-cropping, Field

Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a closegrowing crop is alternated with a clean-tilled crop or fallow.

To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.

Subsurface Drains

A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.

The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.

Surge Irrigation

Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.

Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the field and a more uniform application.

Tail water Recovery & Pumpback System

A facility to collect, store, and transport irrigation tail water for reuse in a farm irrigation distribution system. To conserve farm irrigation water supplies and water quality by collecting the water that runs off the field surface for reuse on the farm.

Terraces

An earth embankment, a channel, or a combination ridge and channel constructed across the slope.

Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.

Use Exclusion

Excluding animals, people or vehicles from an area.

To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.

Water and Sediment Control Basin An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.

To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.

Watering Facility

A device (tank, trough, or other watertight container) for providing animal access to water.

To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.

Wetland Development/Restoration The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland. To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Alfalfa Hay, Irrigated South ID-Cut Mature

NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S.

Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculate the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0- to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct an S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes, and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops would have sufficient residual for alfalfa.

BORON

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do not use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the re-growth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition.

Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however. Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage.

Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom

NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from

the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S.

Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculate the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0- to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct an S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes, and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops would have sufficient residual for alfalfa.

BORON

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do not use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the re-growth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition.

Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however. Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage.

Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

Potatoes NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Most Idaho potato fields will respond to fertilizer nitrogen (N). The N rate used, along with other management factors, particularly irrigation, can have a marked effect on the yield and quality of the

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical potato yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a good potato yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by potatoes for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in pre-plant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of potatoes.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which potatoes are grown rarely receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original

sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to potatoes. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system. Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

dressed.

Fertilizer application rate (deficit) or Over application of Nitrogen =

(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test)
(previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizer recommendations are for Russet Burbank potatoes grown on sandy loam soils. Adjustments are made for very sandy soils (add 30 lb N/acre) and silt loam soils (subtract 40 lb N/acre) to account for differences in nitrogen mineralization rates and nitrogen use efficiency. To maximize yield and quality, growers should aim to have about 40 to 45% of their total N supply applied by row closure. Nitrogen applications made during tuber bulking should be guided by petiole sampling to maintain at least 15,000 ppm N03-N in the fourth petiole from the growing tip.

Excess levels of soil N at or before tuberization can delay tuber growth, reduce yields and lower tuber specific gravity. Excess N in late summer and fall can delay maturity of the tubers. This delayed tuber maturity can adversely affect tuber storability and quality.

The N needs of the potato crop are best met by split-application of N fertilizer. This involves applying lower rates of N fertilizer pre-plant and at planting, with the remainder of the crop's N needs applied with the irrigation water. Some cropping systems - for example, furrow irrigation - make it difficult to apply N fertilizer and get efficient plant uptake. Under these conditions most of the crop N needs are applied to the soil before planting.

Nitrogen applied with irrigation water is an effective way to supplement the crop during the growing season. Do not use aqua or anhydrous ammonia in sprinkler system applications. Applications through a sprinkler system are not folar fertilization.

Potato plants need phosphorus (P) for plant growth and will respond to P fertilizer if the soil test concentration is low. Phosphorus soil test for potatoes is based on an extraction with sodium bicarbonate. Soil samples for a phosphorus soil test should be taken from 0- to 12-inch depths. This depth of sampling is critical to achieve an accurate soil test P level. Deviation in sampling depth from the 12-inch depth may drastically alter soil test results.

Phosphorus is immobile in soil and therefore does not move from where it is placed. Applied P fertilizer must be mixed into the seedbed before planting for best results. Banding P fertilizer along side plants has not been as effective as P fertilizer that has been broadcast and incorporated. Eroded or scraped areas, commonly referred to as "white soil" areas, may be low in available P because of its high content of "free lime." These areas should be tested and fertilized separately. To compensate for low P availability when free lime is present in the soil, rates of P are increased with increasing levels of free lime. Total phosphorus concentrations should be kept above 0.22% in the fourth petiole during tuber bulking.

POTASSIUM

Potatoes require high levels of available potassium (K). Potassium is relatively immobile in the soil. For best results, K fertilizers should be applied pre-plant and mixed into the seedbed. Banding beside the plants has been used successfully but is not as effective as K fertilizer which has been broadcast and incorporated.

Potassium fertilizer applications reduce specific gravity of harvested tubers. Potassium chloride fertilizer (KCl or muriate of potash) lowers specific gravity of tubers more than potassium sulfate fertilizer (K2SO4 or sulfate of potash). Growers should avoid over-fertilization of potatoes with K fertilizers. When specific gravity of tubers is important, potassium sulfate is the preferred K fertilizer source. Total potassium concentrations should be kept above 7.0% in the fourth petiole during tuber bulking.

SULFUR

Potatoes generally do not respond to sulfur (S) fertilization. Sulfur response is most likely to occur in sandy soils and in areas where irrigation water sources are low in S. Water low in S includes mountain streams and some well waters. The more irrigation return-flow in the water source the greater the amount of dissolved, plant-available sulfate (S04) form. Elemental sulfur is not recommended because it is not immediately available to plants. Elemental sulfur will require several months from time of application until it is converted to plant-available form.

MICRONUTRIENTS

"Shotgun" application of micronutrients - I.e. complete mixes containing boron (B), copper (Cu), iron (Fe), manganese (Mn) and zinc (Zn) - "for insurance" are not recommended since these elements have not been shown to give an economical response. Soil tests for individual micronutrients are available and concentrations in the 0- to 1-inch soil sample are: B = 0.5 ppm, Cu = 0.2 ppm, Fe = 4.0 ppm, Mn = 2.0 ppm, Zn = 0.5 ppm. Critical concentrations represent values below which a response from the application of that micronutrient may be obtained.

Zinc deficiencies have not been widespread on potatoes although some crops in certain areas of southern Idaho do show a Zn deficiency. When the soil test for Zn is below the critical concentration or where land leveling or erosion has exposed white subsoil containing free lime, apply Zn fertilizer at a rate which will supply 10 pounds of Zn per acre or equivalent. This amount of Zn should be sufficient for 4 to 6 years of crop production.

GENERAL COMMENTS

The P, K, and Zn nutritional status of the plant should also be monitored during the growing season. The same petiole sample used for N03-N concentrations can also be used for this purpose. Guidelines for adequate concentrations of these and other nutrients in the petiole can be obtained from your county agricultural Extension agent, consultant, or fieldman.

Fertilizer materials containing P, K and Zn should be thoroughly incorporated into the root zone. These

Sugarbeets NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Controlling the amount of N available to the sugar beet is critical in producing high beet tonnage with high sugar percentage. Nitrogen in excess can reduce sugar percentage and gross income per acre.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical sugar beet yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. Soils that retain moisture tend to mineralize more N than soils such as sandy loams, which dry out more rapidly. Mineralization of N is limited by cooler soil temperatures that limit soil biological activity.

While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Accurate soil sampling and analysis in a high value crop like sugar beets is one of the best investments that can be made and is highly recommended. A soil test measures the residual N carryover from the previous crop and provides the necessary information for accurate fertilizer application. Nitrate nitrogen (NO3-N) is mobile in the soil. Soil samples, therefore, should be taken from the 0- to 12-inch and 12- to 24-inch soil depths or the effective root zone. These depths should be sampled and kept separate for analysis.

If the first foot is low in N (less than 5 ppm) but the sum of the first 2 feet is adequate, 20 to 40 pounds of N per acre may be applied to provide N until root growth is sufficient to reach the N in the second foot (about 4 to 5 weeks after emergence).

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Non-cereal residues (potatoes, sugar beets, onions, beans, mint, and sweet corn) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of sugar beets.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Very few soils used for sugar beets receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to sugar beets. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =

(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test)
(previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizers can be fall applied on loam, silt loam, and clay soils. Winter leaching of N from the soil profile can be reduced to a minimum by applying N in the ammonium or urea forms when soil temperature is below 45 F. Greater efficiency may be obtained from pre-plant application in spring or by side dressing before July 1. Nitrogen applied after July 1 stimulates vegetative growth, lowers sugar percentage and extractability and contributes little to total sugar yield.

On sandy soils where over-irrigation and leaching of nitrogen are likely, side dressing or applications of nitrogen through irrigation water before July 1 are suggested for at least half of the rate used.

Split N applications often increase nitrogen use efficiency, sugar beet tonnage, and sugar production. Research conducted at the Kimberly R & E Center during 1992-1994 showed that split N fertilization generally increased estimated recoverable sugar and net economic return/acre compared to applying all N pre-plant. However, growers need to avoid applying significant amounts of N late in the growing season, which can stimulate top growth at the expense of sugar production.

The practice of placing starter fertilizer with the seed is not recommended because it will reduce germination and result in poor stands.

PHOSPHORUS

Sugarbeets will respond to P fertilizer if soil test levels are low. The soil test is based on extractable P present in the upper 12 inches of the soil.

Phosphorus should be plowed down or applied to rough-plowed ground and worked into the seedbed. High rates should not be placed with or immediately below the seed. Side dressing is recommended when late applications are necessary.

POTASSIUM

Sugarbeets require less K than potatoes or alfalfa but will respond to K fertilization if soil test levels are low. The soil test is based on the extractable K present in the upper 12 inches of the soil. Potassium should be incorporated into the seedbed.

MICRONUTRIENTS

Deficiencies of Zn are not widespread in sugar beets. When the soil test for Zn is below 0.6 ppm in the upper 12 inches of the soil, or where land leveling has exposed white, limey subsoil, apply Zn fertilizer at a rate that supplies 10 pounds of zinc per acre or equivalent.

"Shotgun" applications of micronutrient mixtures "for insurance" have not been necessary or economical; therefore, they are not recommended.

SULFUR

Sulfur is generally not deficient in the major sugar beet-growing region of Idaho where the Snake River is the source of irrigation water. In areas known to be S deficient or where the soil test is less than 8 ppm in the 0- to 12-inch soil sample, apply 30 pounds S per acre.

GENERAL COMMENTS

Uniform plant populations (110 to 130 plants per 100 feet of row) after thinning have produced the highest root yields and sugar percentages.

Wheat-Spring, Irrigated South ID SOIL SAMPLING

Spring soil sampling is critical for producing economical yields of high quality irrigated spring wheat.

Soil fertility varies among and within fields. Therefore, each soil sample submitted to a soil test laboratory should consist of sub samples collected from at least 20 individual sites within a uniform area. Collect separate samples from the 0-to 12-inch and 12-to 24-inch depths. Skip areas that do not represent the majority of the field such as gravelly areas, saline or sodic areas, wet spots, and turn rows. Thoroughly mix the 20 sub samples in a clean plastic bucket, keeping the first-foot samples separate from the second-foot samples. Place about one pound of the mixed soil in a plastic-lined soil sample bag. Fill out all required information (name, field number, date, depths, and crop history). Do not store samples under warm conditions because microbial activity can change the extractable N in the soil sample. Send soil samples to the laboratory for analysis as quickly as possible. For more detailed information about soil sampling, refer to EXT 704, Soil Sampling. If sizable areas within fields differ visually or in productivity, these areas may need to be sampled separately and managed differently. Precision ag technology and variable rate applicators now provide options for differentially fertilizing

these areas. For information on mapping soil variability and treating mapping units differently, contact an extension soil fertility specialist, your local county ag extension educator, or a fertilizer dealer/consultant.

NITROGEN (N)

Adequate N is necessary for maximum production of irrigated spring wheat. The amount of fertilizer N required to produce the maximum economic return depends on many factors. These factors include the yield estimate, amount of inorganic N remaining from the previous crop, mineralizable N, other N sources, and the previous crop residues.

TOTAL N REQUIREMENTS BASED ON ESTIMATED YIELD

Fertilizer N rates should correspond to the yield growers can reasonably expect for their soil conditions and management. Historical yields for a specific field or area will generally provide a fair approximation of yield potential, given the grower's traditional crop management. Projected changes in crop management (water management, variety, lodging control, disease and weed control) designed to appreciably increase or reduce production may require adjustment of yield estimates. Areas of fields known to differ considerably in yield, based on previous long-term observations or yield mapping, may also require adjustment of the total N required. The available N from all sources required to produce a bushel (60 pounds) of irrigated spring wheat depends on several crop management practices. Factors such as weed, insect, and disease control as well as irrigation, planting date, water management, and soil type can influence the N required for maximum yield. Results of field trials suggest that two pounds of available N per bushel are required for irrigated spring wheat ranging in yield from 80 to 120 bushels (bu) per acre. Nitrogen requirements per bushel may be greater for yields below 80 bu per acre, but less than two pounds N per bu for yields above 120 bu per acre.

AVAILABLE NITROGEN

Available nitrogen (N) in the soil includes inorganic N measured as nitrate (NO 3 -N) and ammonium (NH 4 -N), mineralizable N (released from organic matter during the growing season), N credits from previous cropping or manures, and in some cases the N in irrigation water. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

INORGANIC NITROGEN

Residual soil inorganic N (NO3, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Research indicates that soil test inorganic N is used as effectively as fertilizer N. Ammonium N (NH4-N) is generally low in spring pre-plant soil samples and thus contributes little to available N. However, NH4-N should be determined along with NO3-N when there is reason to expect appreciable NH4-N from previous ammonium N fertilizer applications. To convert soil test NO3-N and NH4-N values to pounds (lb) N per acre, sum the N expressed in parts per million (ppm) for each foot increment of sampling depth and multiply times four. A pre-plant soil sample is often only collected from the first foot of soil. Although this information is not as complete and reliable as would be provided by deeper sampling, residual N measurements from the first foot of soil can be combined with estimates of residual N in the second foot to predict N requirements for irrigated spring wheat. Pre-plant soil test NO3-N in the second foot of the soil is commonly only one-half to two-thirds as high as in the first foot of soil, unless previous crop irrigation or over winter precipitation has leached N from the surface foot. Basing N rates on estimates rather than actual measurements of residual N in the second foot increases the risk of recommending either too little or too much N.

NITROGEN FROM PREVIOUS CROP RESIDUE

Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of residue

returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, Wheat Straw Management and Nitrogen Fertilizer Requirements. Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of spring wheat. Sweet corn residues typically are higher in N content than mature field

corn residues. In addition, they are returned to the soil earlier and decompose more rapidly, therefore releasing more N to subsequent spring wheat than mature corn stalks. Legume residues are typically rich in N and can release appreciable N for spring wheat. Bean and pea residues are fairly rapidly decomposed and the N release from them should be reflected in the pre-plant spring soil test for N. Alfalfa residues decompose less rapidly and the N release is not typically indicated by the pre-plant soil test.

MINERALIZED NITROGEN

Soils vary in their capacity to release N from organic matter during the growing season. Measurements of mineralizable N for spring cereals typically range from 30 to 60 lb per acre. Unless the capacity of a specific soil to release N is known, use a midpoint mineralizable N value of 45 lb N per acre for irrigated spring wheat. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, organic matter does not accurately predict the amount of N that is mineralized in southern Idaho irrigated soils.

NITROGEN FROM MANURE AND WATER

Fields used for spring wheat occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources can be appreciable and should be taken into consideration when estimating available N. Manures can vary in nutrient content depending on the animal source, how the manure is processed, and the quality and quantity of bedding material included. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content. For more detailed information on animal manures and their nutrient contributions to soils, refer to PNW 239, How to Calculate Manure Application Rates in the Pacific Northwest. Irrigation waters other than lagoon effluents can also contain appreciable N. While most well and surface waters used for irrigation have low N concentrations, irrigation waters that receive appreciable return flows from other districts are likely to be higher in N. To convert the N content of each acre foot of irrigation water applied to the lb N per acre fertilizer equivalent, multiply the ppm or milligrams per liter (mg/l) N concentration by 2.7. Pre-plant applied N is easily leached beyond developing seedling root systems with early season irrigation. If early season irrigation is necessary to ensure proper vegetative development, consider reducing the time for each set. Set time can be lengthened as the root system develops more fully. Nitrogen located below the developing root system is not taken up as readily by the plant or used as effectively for yield.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, several available N components must be estimated: (1) total N needed for a given yield, (2)mineralized N, (3) inorganic N (NO3 + NH4) as measured by the soil test, (4) previous crop/residue management, and (5) manuring practice or irrigation water N concentration.

NITROGEN AND LODGING

Irrigated spring wheat is more susceptible to lodging at high available N levels than winter wheat. Lodging can reduce both grain yield and quality, as well as increase harvest costs. Varieties differ in straw strength, plant height, and their susceptibility to lodging. For descriptions of varieties and their susceptibility to lodging, refer to PR327, 2000 Idaho Certified Seed Selection Guide for Some Varieties of Spring Wheat. Ethephon (Cerone ®)is a growth regulator commonly used to shorten small grains, stiffen straw, and reduce lodging. Growers should consider using this growth regulator for wheat in soils with high available N if lodging is historically a problem.

The hard wheat market, both red and white, often pays a premium for high protein. Hard spring wheat varieties can differ in grain protein. However, the most critical factor for producing high protein irrigated wheat is the amount and timing of N fertilization. To produce high protein wheat, first determine the total fertilizer N required to maximize yield. High protein generally is not realized unless available N matches or exceeds that required for maximum yield. The nitrogen applied for maximizing yield should be applied pre-plant. Split applications of N can increase wheat protein, but even split applied N may not raise protein to acceptable levels if the total N available is not sufficient for maximum yield. Between boot and flowering is the best time to influence grain protein with delayed applications. The optimum N rate for increasing protein to 14 percent may vary depending on the final yield. Higher yields increase and lower yields reduce the optimal delayed N rate. Flag leaf N testing can be useful for determining the need for later applied N. Research indicates that there is little protein increase with subsequent applied N when flag leaf total N concentration at heading is 4.2 to 4.3 percent or greater. The required N rate increases as flag leaf N values decrease below the critical value. If flag leaf N at heading is above 3.8 percent, no more than 40 lb N per acre should be needed to increase protein to 14 percent. If flag leaf N is below 3.8 percent, higher N rates may be needed.

PHOSPHORUS (P)

Irrigated spring wheat requires adequate soil P for maximum economic yields. Soil testing for P provides a reasonable estimate of available P. Optimum P fertilizer rates depend on both soil test P and soil lime content. Plant maturity may be delayed when soil test P concentrations are low and free lime content is greater than 10 percent. However, grain yields are usually unaffected when the growing season is sufficient. When banding an ammonium P source (11-52-0) at rates above 20 lb per acre, separate the seed and the fertilizer material by two inches to avoid seedling damage from salts. For a detailed discussion of

banding refer to PNW 283, No-Till and Minimum Tillage Farming: Fertilizer Band Location for Cereal Root Access. Incorporate P fertilizer during s seedbed preparation. Solution P, such as ammonium polyphosphate, may be applied through a sprinkler irrigation system. Check the compatibility of the irrigation water and the P material. If precipitates form, decrease the fertilizer concentration or increase the injection time.

POTASSIUM (K) AND CHLORIDE (CI)

Soil test K is a reasonable indication of available K in southern Idaho soils. Incorporate K during seedbed preparation. Potassium chloride increases yields where take-all root rot is prevalent, regardless of the soil test K level. This response is due primarily to the chloride component. Wheat yield may also increase when not infected with take-all if extractable soil Cl is below 30 lb per acre in the first two feet. Low soil Cl has been associated with physiological leaf spot. Soil Cl can be measured with a soil test. If soil test Cl is less than 8 ppm for the first two feet combined, apply 40 lb Cl per acre in the form of potassium chloride. Do not drill band Cl with the seed as germinating seed may be injured by excessive salts.

SULFUR (S)

Sulfur fertilizer requirements for spring wheat depends primarily on the S content of irrigation water and the S soil test. Coarse-textured soils are more likely to be low in S than fine-textured soils. Wheat irrigated with Snake River water or waters consisting of significant runoff from other fields should not require fertilizer S. Soils should be tested for S to a depth of two feet as the available form of S, or sulfate, is mobile. Soils low in S (less than 35 lb per acre in the 0-to 24-inch depth) should receive 20 to 40 lb of S per acre. Use S fertilizers containing readily available sulfate rather than elemental S to rapidly correct S shortages.

MICRONUTRIENTS (Fe, Mn, Zn, Cu, B)

Spring wheat yield responses to iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), boron (B), and other micronutrients are rarely observed in southern Idaho. Micronutrient applications may be needed

occasionally on severely scraped or eroded areas.

Contact your County Extension Agent if you have any questions regarding the interpretation of this information or for further information on your local needs.

Wheat-Winter, Irrigated South ID NITROGEN

Adequate nitrogen is necessary for maximum production of irrigated wheat. Nitrogen represents, by far, the largest share of fertilizer costs for wheat in Idaho. The amount of nitrogen required depends on many factors which influence total wheat production and quality. Both yield potential and available nitrogen (N03 = NH4) should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical wheat yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a bushel of irrigated wheat depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by wheat for maximum yield. The results of irrigated field trials in the Boise and Magic valleys suggest as a rule that 2 pounds available N per bushel of wheat is required for maximum production up to 120 bushels per acre. Above 120 bushels per acre, the factor is somewhat less than two.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in pre-plant soil samples and thus contributes little to available N. However, it can be as high as or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications.

A pre-plant soil sample is often only collected from the first foot of soil. Although this information is not as complete and reliable as would be provided by deeper sampling, residual N measurements from the first foot of soil can be combined with estimates of residual N in the second foot to predict N

first foot of soil can be combined with estimates of residual N in the second foot to predict N requirements for irrigated winter wheat. For fall planted winter cereals in western Idaho, pre-plant soil test N03-N in the second foot of the soil is commonly only one-half to two-thirds as high as in the first foot of soil. However, this estimate may not be accurate after potatoes or other sprinkler irrigated crops, especially in coarser textured soils. Basing N rate recommendations on estimates of residual N in the second foot increases the risk of recommending either too little or too much N.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require

additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of winter wheat. Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which winter wheat is grown occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciable depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to winter wheat. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen = (Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) -

(previous crop/residue management) - (Manure Nitrogen) - Irrigation Water

TIMING OF NITROGEN APPLICATION

Excessive irrigation or heavy winter precipitation can result in leaching of nitrate N beyond the root systems. This hazard exists on all soils, but particularly on coarse textured soils such as sands, and sandy loams. Fall pre-plant N was once thought to be as good or preferable to spring top dressed N in calcareous silt loam or clay soils in areas of low rainfall. However, even under these conditions, southern Idaho research has shown than N applied in late winter or early spring is frequently used more effectively than early fall pre-plant applied N.

Nitrogen fertilizers containing ammonium (ammonium sulfate, anhydrous or aqua ammonia, or urea) are less subject to leaching losses when lower soil temperatures (less than 40 F) inhibit the microbial conversion of ammonium to nitrate. Lower temperatures also reduce the microbial activity that is responsible for the immobilization of applied N. Late fall, split, or spring applied N is also recommended when residues from previous grain or mature corn crops are returned to the soil in early fall. Early spring N applications are more effective for increasing grain protein for irrigated hard red winter wheat. Nitrogen applied after the boot stage will contribute more to grain protein than to yield. Most wheat varieties respond in a similar way to N. However, varieties differ in their tolerance of high N rates. High N contributes to lodging of varieties with poor straw strength.

PHOSPHORUS (P)

Wheat requires little phosphorus compared to the P requirements of other crops although minimum soil levels are necessary for maximum production. Adequate P is especially necessary for winter hardiness. Soil tests can indicate whether soils require phosphorus fertilization for maximum wheat production. Soil samples are taken from the 0- to 12-inch depth.

Broadcast plow down, broadcasts seedbed incorporation or drill banding low rates of P with seed are effective methods of application. Drill banding may reduce the fertilizer P required. Drill banding high rates of P, especially ammonium phosphate fertilizers, can cause seedling damage. For more detailed discussion of banding, refer to PNW 283, "Fertilizer Band Location for Cereal Root Access."

POTASSIUM (K)

Wheat has a lower requirement for K compared to sugar beets, corn or potatoes. Soil tests can be useful indicators of the need for K. Potassium should be incorporated during seedbed preparation.

SULFUR (S)

Sulfur requirements for wheat will vary depending on soil texture, previously incorporated crop residues, leaching losses, S content of irrigation water and S soil test. Wheat irrigated with Snake River water should not experience S shortages. Soils low in S (less than 10 ppm S04-S in the plow layer or 8 ppm in the 0- to 12-inch depth) should receive 20 to 40 pounds of S per acre.

Sulfur deficiency appears as a general yellowing of the plant early in the season and looks much like N deficiency. Plant analysis can be a useful means of differentiating between the two deficiencies. An N to S ratio of 17 in whole plant tissues is generally used for diagnosing sulfur deficient wheat. Sulfur deficient wheat has also been known to contain high nitrate nitrogen (N03-N) concentrations.

MICRONUTRIENTS

Micronutrients have not been shown to be limiting wheat production and "shotgun" application of micronutrient mixtures containing boron, manganese, iron and copper "for insurance" have not been shown to be responsive and are not suggested.

GENERAL COMMENTS

Avoid a heavy first irrigation on spring cereals to prevent water logging, reduced tillering and N leaching.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:
 - Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

- 2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.
- 3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

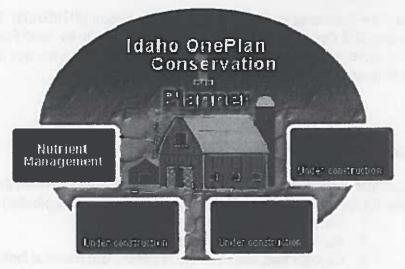
Field: No Data Date of Test: No Data

Field: No Data	Date o	of Test:	No Data	
Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	- 3
E <i>C</i>	mmhos	No Data	No Data	
PH	4 =	No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
P _	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	m
Ca	ppm	No Data	No Data	
Мэ	ppm	No Data	No Data	
Na	ppm	No Data	No Data	·

Grandview Aslett Place

Nutrient Management Plan

Agriculture . . . Launching into the Future



Nutrient Management Plan Prepared For:

Grandview Farms (208) 834-2231 Aslett Place

Certified Planner:

Michael Mitchell
Professional Engineer, EAC Engineering, Inc
(559) 381-0607

Producer Signature:	Certificated Planner Signature:	
	Date Completed: 10-02-07	

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade socrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27.17D6)

7

ASLETT PLACE Producer Summary

Farm Summary

Aslett Place is an existing farm located 9 miles southeast of Grandview, Idaho. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of three pivot irrigated fields, two handline irrigated fields, and one linear move field for a total of 740 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot.

Farm Resource Concerns

Aslett Place located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 01'11" 42N 52'59" using GPS Coordinates. The primary resource concern for Aslett Place is ground water quality. No canals, laterals or ditches with irrigation water are near the fields to cause any type of runoff. Solid waste is applied to all of the fields and incorporated within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

- 1. Fertilizer application rates
- 2. Manure/Compost application rates
- On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
- 4. Fields to which the nutrients are applied
- 5. Spring soil test for nitrogen (required annually) 0-12" and 12-24" nitrogen test

Crop Nutrient Requirement								
Crop	Pounds of P205 per acres							
Alfalfa	86							
Potatoes	76							
Wheat	72							

Manure/C	ompost field applica	ation	requirement (tons)		
	cres X crop nutrier	nt rec	quirement + manure p2	05 value [*] = Tons required	
Example	THE RESERVE OF THE PARTY OF THE	10.000		÷ 16.85	
Corn	250	X	75** = 18750	+ 16.85* = 1112.76 tons	

^{*}based on manure test values for P205
**pounds of p205 required per acre

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop

irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Aslett Place ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

- 1) assure proper containment of animal manure and process waste water
- 2) assess resource concerns which exist on the property
- 3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.

4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO₅) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue). Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1): Grandview Farms

Address: 1301 Hwy 67, Grandview, ID 83624

Phone: (208) 834-2231 N/A

N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation

Bruneau River

District: County:

Owyhee

Watershed Basin:

C. J. Strike Reservoir, Middle Snake-succor

(USGS Hydrologic Unit Code # 17050101, 17050103)

Farm Resource Concerns

Aslett Place is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

		_																		
WATERBODY	BOUNDARIES	IRACT	CHAN STAB	DO	FLOW	HAB	MET	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	•
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	Х

Aslett Place is not located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

Priority 1 is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

Priority 2 is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of humancaused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Aslett Place is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

No Resource Concerns -

Field Name	Subsurface Feature	Depth from Surface (in)
F1	Hard Pan	20
	Fractured Bedrock	20
	Water Table	>72
F 2	Hard Pan	20
	Fractured Bedrock	20
	Water Table	>72
F 3	Cobbles	12
	Fractured Bedrock	20
	Water Table	>72
F 5	Cobbles	13
	Hard Pan	20
	Fractured Bedrock	20
	Water Table	>72
F 6	Cobbles	13

	Hard Pan	20
	Water Table	>72
F 7	Cobbles	13
	Fractured Bedrock	20
	Water Table	>72

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NHB	Na	Carbonate	Bicarbonate
No	No	No Data	No	No	No	No	No	No	No Data	No Data	No Data
Data	Data	140 Daia	Data	Data	Data	Data	Data	Data	110 Data	110 Data	110 2 4

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshold Soil Test Depth
F 1	Groundwater < 5'	20	18 - 24"
F 2	Groundwater < 5'	20	18 - 24"

F 3	Groundwater < 5'	20	18 - 24"
F 5	Surface Water	40	0 - 12"
F 6	Groundwater < 5'	20	18 - 24"
F 7	Groundwater < 5'	20	18 - 24"

Farm Location

 $\frac{\text{Idaho Transverse Mercator}}{\text{Coordinates of the farm center (meters): } X = 2336148.6466722, Y = 1303285.91987303$ Map Scale: 1:305



Figure 1. Base Map

Farm Location

 $\frac{\text{Idaho Transverse Mercator}}{\text{Coordinates of the farm center (meters): } X = 2336148.6466722, Y = 1303285.91987303$

Map Scale: 1:47

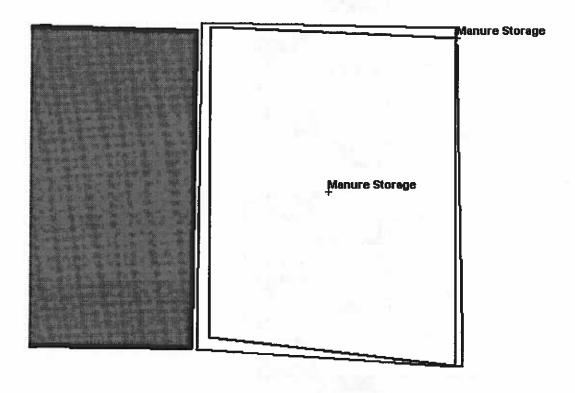


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: F 1

Name	Man App		Imported Nutrient	Mine	ralization	т	otal
	3	Γ	5 T/hc				
alfa Hay, Irrigated South ID-Cut Mid Bloom(2004 Potatoes(2005) lifa Hay, Irrigated South ID-Cut Mid Bloom(2006	Y	N	58	N	0	N	58
	· ·	P	84			P	84
		K	322	隆		K	322
			5 T/ac				
Potatoes(2005)	v	N	58	N	97	Z	155
,		P	84			P	84
		ĸ	322			K	322
			5 17/ac			Ī	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	Z	58	N	32	Z	90
		P	84			P	84
		ĸ	322			K	322
			5'Thic				1
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	v	N	58	N	32	N	90
		P	84			P	84
		ĸ	322			K	322
			3.T/ac	Г			
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	ι _γ	N	58	N	32	Z	90
		P	84			P	84
	70.00	K	322			ĸ	322
			5T/ac				4
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y	N	58	N	32	Z	90
ulfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)		P	84		1	P	84
2275		ĸ	322			ĸ	322

FIELD: F 2

Name	Man Ap	P	Imported Nutrient	Miner	alization	т	otal
100		T	#T/ac				
Wheat-Spring, Irrigated South ID(2004)	Y	N	50	N	45	N	95
When-Spring, Irrigated South In-(2004)		P	72		900	P	72
		К	276			ĸ	270
		T	4/D/ac				
Wheat-Spring, Irrigated South ID(2005)	Y	N	50	N	35	N	85
		P	72		100	Þ	72
	1524	ĸ	276			ĸ	276
Wheat-Spring, Irrigated South ID(2006)	Y		4/7/ac				
		N	50	N	35	N	85

11		P	72		538	P 72
		к	276			K 276
			-4 17/ac			П
Wheat-Spring, Irrigated South ID(2007)	Y	N	50	N	73	N 123
,		P	72	20	. *	P 72
		к	276			K 276
,			4Dac			П
Wheat-Spring, Irrigated South ID(2008)	Y	N	50	N	73	N 123
, , , , , , , , , , , , , , , , , , , ,		Р	72			P 72
		к	276			K 276
Wheat-Spring, Irrigated South ID(2009)			4°T/sc			П
	Y	N	50	N	73	N 123
		P	72	120		P 72
		к	276			K 276

FIELD: F 3

Name	Man Apı	ł	Imported Nutrient	Miner	alization	T	otal
		Ī	Sittles .				
Aifalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	l _v	Z	58	N	0	N	58
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		P	84	100	337	P	84
		ĸ	322	多道		K	322
			5 T/ac			П	
Potatoes(2005)	Y	N	58	N	97	N	15:
		P	84	3		Р	84
		K	322			K	322
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)			5 TVac			П	
	Y	Z	58	N	32	И	90
		P	84			P.	84
	2	k	322			K	322
		П	S'Efac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	58	N	32	И	90
		P	84			P	84
		ĸ	322	1		K	322
			5 Tiles				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y	N	58	N	32	N	90
		P	84			P	84
		ĸ	322			K	322
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y	N	5B	N	32	Z	90
Arialia Hay, irrigated South ID-Cut Mid Bloom(2009)		P	84			P	84
	. 9	к	322	NS.	100	к	322

FIELD: F 5

Name	Man App		pp Imported Nutrients		Mineralization		ľotal
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		4 Tyac			Γ	
		N	51	N	0	N	51

		P	74	20	BE E	P	74
		к	282		1	K	282
		1	4ºT/ac		, S	П	Г
Wheat-Spring, Irrigated South ID(2005)	Y	N	51	N	107	N	15
, , ,		P	74			P	74
		K	282			K	28
			4ºTrac			П	50
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	51	N	-10	N	41
		P	74	186	-	P	74
	_	K	282		TO SERVICE STATES	K	28:
2	Y		4717ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)		N	51	N	28	N	79
		P	74			P	74
5-2-55-y		K	282			K	282
		Market	4 Trac		er s	П	229
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y	N	51	N	28	N	79
		P	74		Elo.	Р	74
		K	282			K	282
		1	4/I/ac			П	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y	N	51	N	28	N	79
		P	74		27	P	74
		K	282			ĸ	282

FIELD: F 6

Name	Man App		Imported Nutrient	Miner	alization	ł	otal
			5 Then.				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Ιγ	N	56	N	0	N	56
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		P	81		44	P	81
28		K	310			K	310
			5 T/ac				30
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	V V	N	56	N	31	N	87
		₽	18			P	81
		K	310	100 M		K	310
Alfalfa Hav. Irrigated South ID-Cut Mid Bloom(2006)	-		S/D/ac				3
	Y	N	56	N	31	N	87
		P	81			P	81
		K	310			ĸ	310
			5 Dac				
Wheat-Spring, Irrigated South ID(2007)	Y	N	56	N	76	N	132
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(200 Wheat-Spring, Irrigated South ID(2007)	1	P	81			P	81
		K	310			K	310
			.5 Trac			l	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y	N	56	N	31	N	87
		P	81			P	81
		K	310			K	310
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ec		18		9
	155 V 20	N	56	N	31	N	87

P	81	P 81
к	310	K310

FIELD: F 7

		_		_		_	_
Name	Man App		Imported Nutrients	Mine	ralization	T	otal
			5 Trac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	58	N	. 0	N	58
, , , , , , , , , , , , , , , , , , , ,		P	84			P	84
		ĸ	322			K	322
r			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	Z	58	N	32	Z	90
,, ,		₽	84			P	84
		ĸ	322			ĸ	322
			5 Trac				
Potatoes(2006)	Y	N	58	N	32	N	90
,		P	84			P	84
		K	322			K	322
	Y		S TVac				
Alfalfa Hay, Irrigated South 1D-Cut Mid Bloom(2007)		N	58	N	32	N	90
		P	84			P	84
		K	322			K	322
			572/ac				
Alfalfa Hay, irrigated South ID-Cut Mid Bloom(2008)	Y	N	58	N	32	N	90
,		P	84			P	84
		K	322			ĸ	322
		1	5 Tries				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	v I	N	58	N	32	N	90
		P	84		E TO	P	84
		ĸ	322		图	ĸ	322

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	665

The acreage in the table is based on an average crop uptake of 100 lbs P₂O₅ per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Division of Animal Industries.

Hydraulic Balance

Field	Date		
F 1	April 1		
F 2	April 15		
F 3	May 1		

F 5	May 1
F 6	May 1
F 7	April 15

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test

Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: F1 Crop: Potatoes Yield: 550

	N	P205	K20
Crop Nutrient Requirement	330	76	343
Nutrients From Soil	?	展園	1. E.
from Mineralized Nitrogen	0		
from Prior Crops	65		
from Prior Bio-Nutrients	32		
from Irrigation Water	0		0
Nutrient Balance from above	233.8	75.6	343.2
Imported Nutrients	58	84	322
Estimated Remaining Nutrients Required	176	-8	21
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	176	-8	21

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: F2 Crop: Wheat-Spring, Irrigated South ID Yield: 98

	N	P205	K20
Crop Nutrient Requirement	200	72	49
Nutrients From Soil	?		1
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	28		
from Irrigation Water	0	1	0
Nutrient Balance from above	1604	71.8	48,9
Imported Nutrients	50	72	276
Estimated Remaining Nutrients Required	116	0	-227
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	116	0	-227

Caution: Rate is either deficit or is approaching an amount that may potentially contribute to an environmental risk.

Acceptable: Sustainable agronomic rate.

Field: F 3 Crop: Potatoes Yield: 550

	N	P205	K20
Crop Nutrient Requirement	330	76	343
Nutrients From Soil	?	图第	
from Mineralized Nitrogen	0		

from Prior Crops	65		1
from Prior Bio-Nutrients	32		
from Irrigation Water	0		0
Nutrient Balance from above		75.6	343.2
Imported Nutrients		84	322
Estimated Remaining Nutrients Required		-8	21
Commercial Fertilizer Application		0	0
Final Nutrient Balance	176	-8	21

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: F 5 Crop: Wheat-Spring, Irrigated South ID Yield: 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?	STATE OF	
from Mineralized Nitrogen	45		
from Prior Crops	34		
from Prior Bio-Nutrients	28		
from Irrigation Water	0		0
Nutrient Balance from above	113.7	60.5	41.2
Imported Nutrients	51	74	282
Estimated Remaining Nutrients Required		-14	-241
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	63	-14	-241

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Field: F 6 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		KITE OF
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	31		
from Irrigation Water	0		0
Nutrient Balance from above	334.4	85.9	351
Imported Nutrients	56	81	310
Estimated Remaining Nutrients Required	278	5	41
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	278	5	41

Acceptable: Sustainable agronomic rate.

Field: F 7 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

910007	N	P205 K20

Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	32		
from Irrigation Water	0		0
Nutrient Balance from above		85.9	351
Imported Nutrients		84	322
Estimated Remaining Nutrients Required		2	29
Commercial Fertilizer Application		0	0
Final Nutrient Balance	275	2	29

Acceptable: Sustainable agronomic rate.

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	Amount	Consumer	Consumer's Address	Telephone	Acres
No Nutrients exported	ym I		BELLIAN WILL'S		A.

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: F 1

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 83.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Rating: Very High

Rating: Medium

Rating: High

Comments: No Data

Surface Irrigation or Overhead Irrigation

Comments: No Data

Rating: Very Low or N.A.

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 2

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application MethodRating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 71.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil

P levels.

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

Rating: Very High

Rating: High

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 3

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P

Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Rating: Very Low or N.A.

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 83.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Rating: Very High

Rating: Medium

Rating: High

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Rating: Low

Rating: Very High

Comments: No Data

Runoff Best Management Practices

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 5

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 0-12"

Idaho Nutrient Management Standard Threshold: 40

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 73.5

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff N/A

Rating: Very High

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Very High

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices on-field and off-field that reduce or eliminate runoff and erosion.

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system, or sediment retention measures like filter strips or

sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F 6

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Rating: Very Low or N.A.

Rating: Very High

Rating: Medium

Rating: High

Rating: Very Low or N.A.

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 80.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F7

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Rating: Medium

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 83.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific

Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: F 1

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Comments: No Data

Rating: Very Low or N.A.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 2

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tailwater Recovery & Pumpback System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F3

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Rating: Medium

Comments: No Data

Soil/Water Table Depth

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 5

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating:

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: No Data

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: No Data

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth

Rating: Medium

Comments: No Data

FIELD: F 6

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent

subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F 7

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Comments: No Data

Rating: Very Low or N.A.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

NUTRIENT RISK ANALYSIS Legend

ВМР	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover	This practice reduces soil erosion, associated sedimentation, improves

of perennial vegetation on land retired from agriculture production.

water quality, and creates or enhances wildlife habitat.

Conservation Cropping Sequence

Growing crops in a recurring sequence on the same field.

This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.

Contour Farming

Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)

To reduce erosion and control water.

Cover and Green Manure Crop A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.

To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.

Critical Area Planting

Planting vegetation on critically eroding areas that require extraordinary treatment.

This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems,

and 3) Agriculture land with severe gullies requiring specialized planting techniques and management.

Dike or Berm

An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.

Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and

Diversion

A channel constructed across the slope with a supporting ridge on the lower side.

To divert excess water from one area for use or safe disposal in other areas.

archeological sites from damage.

Drip Irrigation

A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.

To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.

Filter Strip

A strip or area of vegetation for removing pollutants water.

A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.

Fish Stream Improvement

Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.

The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.

Grade Stabilization Construction

A structure used to control the grade and head cutting in natural or artificial channels.

These structures are to: Stabilize the grade and control erosion in natural or artificial channels. prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.

Grassed Waterway

A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.

Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.

Grazing Land Mechanical Treatment

Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.

This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.

Heavy Use Area Protection

Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures. To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.

Irrigation Land Leveling

Reshaping the surface of land to be irrigated to planned grades.

To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.

Irrigation Water Management

Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient

Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired

manner.

crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion; Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.

Mulching

Applying plant residues or other suitable materials not produced on the site to the soil surface.

To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.

Polyacrylamide (PAM)

Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water. Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.

Prescribed Grazing

Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.

Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to:
1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.

Residue Management (Conservation Tillage)

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.

This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for

wildlife.

Riparian Forest Buffer

A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.

The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.

Sediment Basin

A basin constructed to collect and store debris or sediment.

A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

Sprinkler System

A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.

To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.

Stream Channel Stabilization

Stabilizing the channel of a stream with suitable structures.

To control aggradation or degradation in a stream channel.

Stream bank Protection

Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent and erosion.

the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.

Strip-cropping, Contour

Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.

To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.

Strip-cropping, Field

Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.

To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.

Subsurface Drains

A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.

The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.

Surge Irrigation

Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of

Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the

constant or variable time spans.

field and a more uniform application.

Tailwater Recovery & Pumpback System

A facility to collect, store, and transport irrigation tailwater for reuse in a farm irrigation distribution system. To conserve farm irrigation water supplies and water quality by collecting the water that runs off the field surface for reuse on the farm.

Terraces

An earth embankment, a channel, or a combination ridge and channel constructed across the slope.

Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.

Use Exclusion

Excluding animals, people or vehicles from an area.

To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.

Water and Sediment Control Basin An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.

To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.

Watering Facility

A device (tank, trough, or other watertight container) for providing animal access to water.

To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.

Wetland Development/Restoration The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland. To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S.

Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculated the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0- to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct a S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes, and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops

would have sufficient residual for alfalfa.

BORON

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do not use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the regrowth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition.

Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however.

Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage.

Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

Potatoes NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Most Idaho potato fields will respond to fertilizer nitrogen (N). The N rate used, along with other management factors, particularly irrigation, can have a marked effect on the yield and quality of the potato crop.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical potato yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a good potato yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by potatoes for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during

the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in preplant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of potatoes. Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which potatoes are grown rarely receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters. For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to potatoes. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation

system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters.

Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =

(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test)

- (previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizer recommendations are for Russet Burbank potatoes grown on sandy loam soils. Adjustments are made for very sandy soils (add 30 lb N/acre) and silt loam soils (subtract 40 lb N/acre) to account for differences in nitrogen mineralization rates and nitrogen use efficiency. To maximize yield and quality, growers should aim to have about 40 to 45% of their total N supply applied by row closure. Nitrogen applications made during tuber bulking should be guided by petiole sampling to maintain at least 15,000 ppm N03-N in the fourth petiole from the growing tip.

Excess levels of soil N at or before tuberization can delay tuber growth, reduce yields and lower tuber specific gravity. Excess N in late summer and fall can delay maturity of the tubers. This delayed tuber maturity can adversely affect tuber storability and quality.

The N needs of the potato crop are best met by split-application of N fertilizer. This involves applying lower rates of N fertilizer preplant and at planting, with the remainder of the crop's N needs applied with the irrigation water. Some cropping systems - for example, furrow irrigation - make it difficult to apply N fertilizer and get efficient plant uptake. Under these conditions most of the crop N needs are applied to the soil before planting.

Nitrogen applied with irrigation water is an effective way to supplement the crop during the growing season. Do not use aqua or anhydrous ammonia in sprinkler system applications. Applications through a sprinkler system are not folar fertilization.

PHOSPHORUS

Potato plants need phosphorus (P) for plant growth and will respond to P fertilizer if the soil test concentration is low. Phosphorus soil test for potatoes is based on an extraction with sodium bicarbonate. Soil samples for a phosphorus soil test should be taken from 0- to 12-inch depths. This depth of sampling is critical to achieve an accurate soil test P level. Deviation in sampling depth from the 12-inch depth may drastically alter soil test results.

Phosphorus is immobile in soil and therefore does not move from where it is placed. Applied P fertilizer must be mixed into the seedbed before planting for best results. Banding P fertilizer along side plants has not been as effective as P fertilizer that has been broadcast and incorporated. Eroded or scraped areas, commonly referred to as "white soil" areas, may be low in available P because of its high content of "free lime." These areas should be tested and fertilized separately. To compensate for low P availability when free lime is present in the soil, rates of P are increased with increasing levels of free lime. Total phosphorus concentrations should be kept above 0.22% in the fourth petiole during tuber bulking.

Potatoes require high levels of available potassium (K). Potassium is relatively immobile in the soil. For best results, K fertilizers should be applied preplant and mixed into the seedbed. Banding beside the plants has been used successfully but is not as effective as K fertilizer which has been broadcast and incorporated.

Potassium fertilizer applications reduce specific gravity of harvested tubers. Potassium chloride fertilizer (KCl or muriate of potash) lowers specific gravity of tubers more than potassium sulfate fertilizer (K2SO4 or sulfate of potash). Growers should avoid over-fertilization of potatoes with K fertilizers. When specific gravity of tubers is important, potassium sulfate is the preferred K fertilizer source. Total potassium concentrations should be kept above 7.0% in the fourth petiole during tuber bulking.

SULFUR

Potatoes generally do not respond to sulfur (S) fertilization. Sulfur response is most likely to occur in sandy soils and in areas where irrigation water sources are low in S. Water low in S includes mountain streams and some well waters. The more irrigation return-flow in the water source the greater the amount of dissolved, plant-available sulfate (S04) form. Elemental sulfur is not recommended because it is not immediately available to plants. Elemental sulfur will require several months from time of application until it is converted to plant-available form.

MICRONUTRIENTS

"Shotgun" application of micronutrients - I.e. complete mixes containing boron (B), copper (Cu), iron (Fe), manganese (Mn) and zinc (Zn) - "for insurance" are not recommended since these elements have not been shown to give an economical response. Soil tests for individual micronutrients are available and concentrations in the 0- to 1-inch soil sample are: B = 0.5 ppm, Cu = 0.2 ppm, Fe = 4.0 ppm, Mn = 2.0 ppm, Zn = 0.5 ppm. Critical concentrations represent values below which a response from the application of that micronutrient may be obtained.

Zinc deficiencies have not been widespread on potatoes although some crops in certain areas of southern Idaho do show a Zn deficiency. When the soil test for Zn is below the critical concentration or where land leveling or erosion has exposed white subsoil containing free lime, apply Zn fertilizer at a rate which will supply 10 pounds of Zn per acre or equivalent. This amount of Zn should be sufficient for 4 to 6 years of crop production.

GENERAL COMMENTS

The P, K, and Zn nutritional status of the plant should also be monitored during the growing season. The same petiole sample used for N03-N concentrations can also be used for this purpose. Guidelines for adequate concentrations of these and other nutrients in the petiole can be obtained from your county agricultural Extension agent, consultant, or fieldman.

Fertilizer materials containing P, K and Zn should be thoroughly incorporated into the root zone. These materials can be effectively applied in the fall.

Wheat-Spring, Irrigated South ID SOIL SAMPLING

Spring soil sampling is critical for producing economical yields of high quality irrigated spring wheat. Soil fertility varies among and within fields. Therefore, each soil sample submitted to a soil test laboratory should consist of sub samples collected from at least 20 individual sites within a uniform area. Collect separate samples from the 0-to 12-inch and 12-to 24-inch depths. Skip areas that do not represent the majority of the field such as gravelly areas, saline or sodic areas, wet spots, and turn rows. Thoroughly mix the 20 sub samples in a clean plastic bucket, keeping the first-foot samples separate from the second-foot samples. Place about one pound of the mixed soil in a plastic-lined soil sample bag. Fill out all required information (name, field number, date, depths, and crop history). Do not store samples under warm conditions because microbial activity can change the extractable N in the soil

sample. Send soil samples to the laboratory for analysis as quickly as possible. For more detailed information about soil sampling, refer to EXT 704, Soil Sampling. If sizable areas within fields differ visually or in productivity, these areas may need to be sampled separately and managed differently. Precision ag technology and variable rate applicators now provide options for differentially fertilizing these areas. For information on mapping soil variability and treating mapping units differently, contact an extension soil fertility specialist, your local county ag extension educator, or a fertilizer dealer/consultant.

NITROGEN (N)

Adequate N is necessary for maximum production of irrigated spring wheat. The amount of fertilizer N required to produce the maximum economic return depends on many factors. These factors include the yield estimate, amount of inorganic N remaining from the previous crop, mineralizable N, other N sources, and the previous crop residues.

TOTAL N REQUIREMENTS BASED ON ESTIMATED YIELD

Fertilizer N rates should correspond to the yield growers can reasonably expect for their soil conditions and management. Historical yields for a specific field or area will generally provide a fair approximation of yield potential, given the grower's traditional crop management. Projected changes in crop management (water management, variety, lodging control, disease and weed control) designed to appreciably increase or reduce production may require adjustment of yield estimates. Areas of fields known to differ considerably in yield, based on previous long-term observations or yield mapping, may also require adjustment of the total N required. The available N from all sources required to produce a bushel (60 pounds) of irrigated spring wheat depends on several crop management practices. Factors such as weed, insect, and disease control as well as irrigation, planting date, water management, and soil type can influence the N required for maximum yield. Results of field trials suggest that two pounds of available N per bushel are required for irrigated spring wheat ranging in yield from 80 to 120 bushels (bu) per acre. Nitrogen requirements per bushel may be greater for yields below 80 bu per acre, but less than two pounds N per bu for yields above 120 bu per acre.

AVAILABLE NITROGEN

Available nitrogen (N) in the soil includes inorganic N measured as nitrate (NO 3 -N) and ammonium (NH 4 -N), mineralizable N (released from organic matter during the growing season), N credits from previous cropping or manures, and in some cases the N in irrigation water. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

INORGANIC NITROGEN

Residual soil inorganic N (NO3, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Research indicates that soil test inorganic N is used as effectively as fertilizer N. Ammonium N (NH4-N) is generally low in spring preplant soil samples and thus contributes little to available N. However, NH4-N should be determined along with NO3-N when there is reason to expect appreciable NH4-N from previous ammonium N fertilizer applications. To convert soil test NO3-N and NH4-N values to pounds (lb) N per acre, sum the N expressed in parts per million (ppm) for each foot increment of sampling depth and multiply times four. A preplant soil sample is often only collected from the first foot of soil. Although this information is not as complete and reliable as would be provided by deeper sampling, residual N measurements from the first foot of soil can be combined with estimates of residual N in the second foot to predict N requirements for irrigated spring wheat. Preplant soil test NO3-N in the second foot of the soil is commonly only one-half to two-thirds as high as in the first foot of soil, unless previous crop irrigation or over winter precipitation has leached N from the surface foot. Basing N rates on estimates rather than actual measurements of residual N in the second foot increases

the risk of recommending either too little or too much N.

NITROGEN FROM PREVIOUS CROP RESIDUE

Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of residue returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, Wheat Straw Management and Nitrogen Fertilizer Requirements. Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of spring wheat. Sweet corn residues typically are higher in N content than mature field

corn residues. In addition, they are returned to the soil earlier and decompose more rapidly, therefore releasing more N to subsequent spring wheat than mature corn stalks. Legume residues are typically rich in N and can release appreciable N for spring wheat. Bean and pea residues are fairly rapidly decomposed and the N release from them should be reflected in the preplant spring soil test for N. Alfalfa residues decompose less rapidly and the N release is not typically indicated by the preplant soil test.

MINERALIZED NITROGEN

Soils vary in their capacity to release N from organic matter during the growing season. Measurements of mineralizable N for spring cereals typically range from 30 to 60 lb per acre. Unless the capacity of a specific soil to release N is known, use a midpoint mineralizable N value of 45 lb N per acre for irrigated spring wheat. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, organic matter does not accurately predict the amount of N that is mineralized in southern Idaho irrigated soils.

NITROGEN FROM MANURE AND WATER

Fields used for spring wheat occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources can be appreciable and should be taken into consideration when estimating available N. Manures can vary in nutrient content depending on the animal source, how the manure is processed, and the quality and quantity of bedding material included. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content. For more detailed information on animal manures and their nutrient contributions to soils, refer to PNW 239, How to Calculate Manure Application Rates in the Pacific Northwest. Irrigation waters other than lagoon effluents can also contain appreciable N. While most well and surface waters used for irrigation have low N concentrations, irrigation waters that receive appreciable return flows from other districts are likely to be higher in N. To convert the N content of each acre foot of irrigation water applied to the lb N per acre fertilizer equivalent, multiply the ppm or milligrams per liter (mg/l) N concentration by 2.7. Preplant applied N is easily leached beyond developing seedling root systems with early season irrigation. If early season irrigation is necessary to ensure proper vegetative development, consider reducing the time for each set. Set time can be lengthened as the root system develops more fully. Nitrogen located below the developing root system is not taken up as readily by the plant or used as effectively for yield.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, several available N components must be estimated: (1) total N needed for a given yield, (2)mineralized N, (3) inorganic N (NO3 + NH4) as measured by the soil test, (4) previous crop/residue management, and (5) manuring practice or irrigation water N concentration.

Irrigated spring wheat is more susceptible to lodging at high available N levels than winter wheat. Lodging can reduce both grain yield and quality, as well as increase harvest costs. Varieties differ in straw strength, plant height, and their susceptibility to lodging. For descriptions of varieties and their susceptibility to lodging, refer to PR327, 2000 Idaho Certified Seed Selection Guide for Some Varieties of Spring Wheat. Ethephon (Cerone ®) is a growth regulator commonly used to shorten small grains, stiffen straw, and reduce lodging. Growers should consider using this growth regulator for wheat in soils with high available N if lodging is historically a problem.

MANAGING NITROGEN FOR HIGH PROTIEN HARD WHEAT

The hard wheat market, both red and white, often pays a premium for high protein. Hard spring wheat varieties can differ in grain protein. However, the most critical factor for producing high protein irrigated wheat is the amount and timing of N fertilization. To produce high protein wheat, first determine the total fertilizer N required to maximize yield. High protein generally is not realized unless available N matches or exceeds that required for maximum yield. The nitrogen applied for maximizing yield should be applied preplant. Split applications of N can increase wheat protein, but even split applied N may not raise protein to acceptable levels if the total N available is not sufficient for maximum yield. Between boot and flowering is the best time to influence grain protein with delayed applications. The optimum N rate for increasing protein to 14 percent may vary depending on the final yield. Higher yields increase and lower yields reduce the optimal delayed N rate. Flag leaf N testing can be useful for determining the need for later applied N. Research indicates that there is little protein increase with subsequent applied N when flag leaf total N concentration at heading is 4.2 to 4.3 percent or greater. The required N rate increases as flag leaf N values decrease below the critical value. If flag leaf N at heading is above 3.8 percent, no more than 40 lb N per acre should be needed to increase protein to 14 percent. If flag leaf N is below 3.8 percent, higher N rates may be needed.

PHOSPHORUS (P)

Irrigated spring wheat requires adequate soil P for maximum economic yields. Soil testing for P provides a reasonable estimate of available P. Optimum P fertilizer rates depend on both soil test P and soil lime content. Plant maturity may be delayed when soil test P concentrations are low and free lime content is greater than 10 percent. However, grain yields are usually unaffected when the growing season is sufficient. When banding an ammonium P source (11-52-0) at rates above 20 lb per acre, separate the seed and the fertilizer material by two inches to avoid seedling damage from salts. For a detailed discussion of

banding refer to PNW 283, No-Till and Minimum Tillage Farming: Fertilizer Band Location for Cereal Root Access. Incorporate P fertilizer during s seedbed preparation. Solution P, such as ammonium polyphosphate, may be applied through a sprinkler irrigation system. Check the compatibility of the irrigation water and the P material. If precipitates form, decrease the fertilizer concentration or increase the injection time.

POTASSIUM (K) AND CHLORIDE (CI)

Soil test K is a reasonable indication of available K in southern Idaho soils. Incorporate K during seedbed preparation. Potassium chloride increases yields where take-all root rot is prevalent, regardless of the soil test K level. This response is due primarily to the chloride component. Wheat yield may also increase when not infected with take-all if extractable soil Cl is below 30 lb per acre in the first two feet. Low soil Cl has been associated with physiological leaf spot. Soil Cl can be measured with a soil test. If soil test Cl is less than 8 ppm for the first two feet combined, apply 40 lb Cl per acre in the form of potassium chloride. Do not drill band Cl with the seed as germinating seed may be injured by excessive salts.

Sulfur fertilizer requirements for spring wheat depend primarily on the S content of irrigation water and the S soil test. Coarse-textured soils are more likely to be low in S than fine-textured soils. Wheat irrigated with Snake River water or waters consisting of significant runoff from other fields should not require fertilizer S. Soils should be tested for S to a depth of two feet as the available form of S, or sulfate, is mobile. Soils low in S (less than 35 lb per acre in the 0-to 24-inch depth) should receive 20 to 40 lb of S per acre. Use S fertilizers containing readily available sulfate rather than elemental S to rapidly correct S shortages.

MICRONUTRIENTS (Fe, Mn, Zn, Cu, B)

Spring wheat yield responses to iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), boron (B), and other micronutrients are rarely observed in southern Idaho. Micronutrient applications may be needed occasionally on severely scraped or eroded areas.

Contact your County Extension Agent if you have any questions regarding the interpretation of this information or for further information on your local needs.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following
 are recommendations in nutrient management, which will optimize nutrient use for crop production
 while protecting water quality:
 - 1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.
 - 2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.
 - 3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data Date of Test: No Data

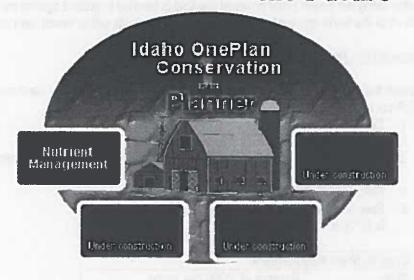
Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	46
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
Р	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	11-
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Сц	ppm	No Data	No Data	

Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

Grandview Boltz Pasture

Nutrient Management Plan

Agriculture . . . Launching into the Future



Nutrient Management Plan Prepared For:

Grandview Farms (208) 834-2231 Boltz Pasture

Certified Planner:

Michael Mitchell Professional Engineer, EAC Engineering, Inc (559) 381-0607

Producer Signature:	Certificated Planner Signature:	2.74
	Date Completed: 10-02-07	

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27.17D6)

BOLTZ PASTURES Producer Summary

Farm Summary

Boltz Pastures is an existing farm located 39 miles south of Boise, Idaho. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of two pastures equaling 365 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot. 250 head of cattle pasture for approximately 30 days on the property.

Farm Resource Concerns

Boltz Pastures is located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 09'19" 43N 02'50" using GPS Coordinates. The primary resource concern for Boltz Pastures is ground water quality. The facility is located along the Snake River however the field is bermed to protect against runoff into the Snake. Solid waste is applied to all of the fields and pasture and incorporated on fields within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

- 1. Fertilizer application rates
- 2. Manure/Compost application rates
- 3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
- 4. Fields to which the nutrients are applied
- 5. Spring soil test for nitrogen (required annually) 0-12" and 12-24" nitrogen test

Crop Nutrient	t Requirement
Crop	Pounds of P205 per acres
Pasture`	73

Manure/Co	mpost field application requirement (tons)
	Acres X crop nutrient requirement ÷ manure p205 value* = Tons required
	A TOTAL STATE OF THE PARTY OF T
Example	Corn - 250(acres) X 75 (crop requirement) ÷ 16.85
Com	250 X 75** = 18750

*based on manure test values for P205
**pounds of p205 required per acre

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

Irrigation schedules continue to be managed by your irrigation specialist.

 Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Grandview Boltz Pasture ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

- 1) assure proper containment of animal manure and process waste water
- 2) assess resource concerns which exist on the property
- 3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.
- 4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO,) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue). Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1): Grandview Farms

Address: 1304 Hwy 67, Grandview, ID 83624

Phone: (208) 834-2231 N/A

N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation

Bruneau River

District: County:

Elmore

Watershed Basin:

Middle Snake-succor (USGS Hydrologic Unit Code #

17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Grandview Boltz Pasture is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW ALT	HAB ALT	MET	MET	NH3	NUTR	0_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	•
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	х

Grandview Boltz Pasture is <u>not</u> located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

<u>Priority 1</u> is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

<u>Priority 2</u> is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Grandview Boltz Pasture is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

• No Resource Concerns -

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Pasture 1	Cobbles	13
	Fractured Bedrock	20
	Water Table	24
Pasture 2	Cobbles	13
	Water Table	42

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No	No	No Data	No	No	No	No	No	No	No	No Doto	No Data
Data	Data	INO Data	Data	Data	Data	Data	Data	Data	Data	INO Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshehold Soil Test Depth
Pasture 1	Groundwater < 5'	20	18 - 24"
Pasture 2	Groundwater < 5'	20	18 - 24"

Farm Location

 $\underline{Idaho\ Transverse\ Mercator}$ Coordinates of the farm center (meters): X = 2323993.31837075, Y = 1318141.32574453



Figure 1. Base Map

Farm Location

 $\frac{\text{Idaho Transverse Mercator}}{\text{Coordinates of the farm center (meters): } X = 2323993.31837075, Y = 1318141.32574453$

Map Scale: 1:188

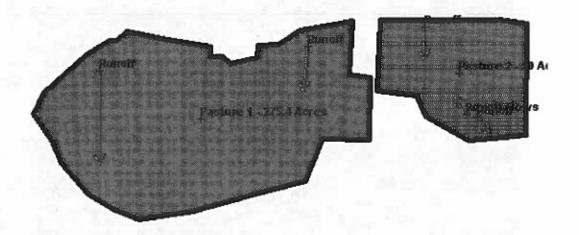


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

Assisted Mode has been turned off.

FIELD: Pasture 1

Name	Мап Арр		Imported Nutrients	Pasture(s)	Miner	alization	T	otal
		i	4/D/ac	1777ac				
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2004)	y I	M	42	0	N	0	N	42
		P	68	5		Total State	P	73
		ĸ	263	6			κ	269
			47frac	1 T/ac				100
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2005)	Y	2	42	0	N	23	N	65
		P	68	5			P	73
SAL SHOP STORY	j.,	ĸ	263	6			ĸ	269
***************************************			4 T/ac	t Trac				
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2006	Y	N	42	0	N	23	N	65
		P	68	5			P	73
		ĸ	263	6	88		ĸ	269
			ATT/so	L'Trec				
Pasture, Irrigated South ID - Poor Condition Root Depth 2 feet(2007)	Ly	N	42	0	N	23	N	65
		P	68	5			P	73
		ĸ	263	6			ĸ	269
			4TD/ac	1 T/ac		1		10
Passure, Irrigated South ID - Good Condition Root Depth 4 feet(2008)	V	N	42	0	N	23	N	65
		P	68	5			P	73
		к	263	6			к	269

FIELD: Pasture 2

Name	Мап Арр	l	Imported Nutrient	Pasture(s)	Miner	alization	1	otal
		П	4-Dag	0 T/ec			T	
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2004)	Y	N	44	0	N	0	N	44
		P	73	0		250	P	73
		к	281	0			K	28
		П	4 Triac	0.T/ac			Τ	
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2005)	Y	N	44	0	N	25	N	69
		P	73	0			P	73
		к	281	0			K	28
	9	П	4 Dec	0 T/ac		65.3000	Τ	
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2006)	Y	N	44	0	N	25	N	69
4		P	73	0			P	73
486		K	281	0			K	281
Pasture, Irrigated South ID - Poor Condition Root Depth 2 feet(2007)	Y		4 T/ac	O T/ac			T	
		N	44	0	N	25	N	69

		P	73	0		445	P	73
		к	281	0			к	281
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2008)		100000	ATIAL	0 T/ac			П	
	Y	N	44	0	N	25	N	69
	•	P	73	0			P	73
		к	281	0	3		K	281

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	297
Pasture(s)	15

The acreage in the table is based on an average crop uptake of 100 lbs P₂O₅ per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture.

Hydraulic Balance

Field	Date		
Pasture 1	March 15		
Pasture 2	April 1		

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test

Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping: For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Pasture 1 Crop: Pasture, Irrigated South ID - Good Condition Root Depth 4 feet Yield: 4

	N	P205	K20
Crop Nutrient Requirement	150	73	0
Nutrients From Soil	?	130	
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	23		
from Irrigation Water	0		0
Nutrient Balance from above	127.7	73.3	0
Imported Nutrients	42	68	263
Pasture(s)	0	5	6
Estimated Remaining Nutrients Required	86	-1	-268
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	86	-1	-268

Caution: Rate is either deficit or is approaching an amount that may potentially contribute to an environmental risk.

Acceptable: Sustainable agronomic rate.

Field: Pasture 2 Crop: Pasture, Irrigated South ID - Good Condition Root Depth 4 feet Yield: 4

N	P205	K20
150	73	207
?		
0		
0		
25		
0		0
100,	73.3	207.4
44	73	281
0	0	0
82	0	-74
0	0	0
82	0	-74
	150 ? 0 0 25 0 44 0 82 0	150 73 ? 0 0 25 0 73.3 44 73 0 0 82 0 0

Caution: Rate is either deficit or is approaching an amount that may potentially contribute to an environmental risk.

Acceptable: Sustainable agronomic rate.

ANALYSIS OF ANIMAL SYSTEM

WASTE STORAGE AND HANDLING

Livestock Unit Characteristic

Description	Animal	Number	Weight	Days Collected	Housing	Bedding Type	Bedding (tons)
	Beef - High forage diet	250	700	30	Open Lot	N/A	0

Manure/Biosolid Groups

Manure Group	roup Type Method mported Manure Broadcast, no		Days to Incorporation	Nitrogen Retention(%)	Annual Volume (ft3)	Annual Weight (tons)	
Imported Nutrients			>7 days	70	381,010		
Pasture(s)	Pasture	Broadcast, no incorporation, no containment	>7 days	14	5,250	165	

^{*} in Nitrogen Retention % Column means "Overridden Nitrogen Values" Assisted Mode has been turned off.

Manure Group		Pasture cattle
Pasture(s)	% To	100
	Group	

Annual Production of Nutrients

The nutrient values were calculated based on animal weight and nitrogen loss estimates as described in the NRCS Agricultural Waste Management Field Handbook guidelines (1996). The calculations are estimates, and manure testing is recommended for more accuracy, as manure nutrient content varies widely among operations.

		Nı	Nutrient Distribution on Facility				
	Pounds N	Pounds P ₂ 0 ₅	Pounds K ₂ 0	% of Total			
Total Nutrients Produced	36176	28028	104004				
Imported Nutrients	35948	26707	102486	98			
Pasture(s)	228	1321	1518	2			

Comments on Bionutrients

No Comments

MANURE STORAGE SUMMARY

Total Solid Capacity									
Bio-Nutrient Group Cubic Feet % Contained									
Pasture(s)	5,250	0%							
Imported Nutrients	381,010	0%							

Containment of Waste and Corral Runoff

It is important that all barn water and contaminated runoff from corrals be contained and/or diverted to the lagoon storage system. As stated in the Idaho State Department of Agriculture (ISDA) regulation, a discharge is allowed only under large precipitation events (>25yr, 24hr storm event). Lagoon structures must be properly designed, operated, and maintained to contain all contaminated runoff from a 25-year, 24-hour rainfall event for the site location and maintained to contain all runoff from accumulation of winter precipitation from a one in five-year winter. Animals confined in the CAFO may not have direct contact with canals, streams, lakes, or other surface waters.

Comments

No Comments

ANALYSIS OF CROPPING SYSTEM

Farming Operation Total Acres: 365.4

Crop Production History
THIS IS NOT A FERTILIZER RECOMMENDATION

Crop Rotation Name: Rotation A

Crop	Yield	Yield Units	N Requirement	P ₂ 0 ₅ uptake	K ₂ 0 Requirement
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet	4	tons/acre	150	73.3	200
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet	4	tons/acre	150	73.3	200
Pasture, Irrigated South ID - Poor Condition Root Depth 2 feet	4	tons/acre	150	73.3	200
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet	4	tons/acre	150	73.3	200
Average				73	

^{*} Nitrogen and Potassium Requirements assume zero credits.

Mapped Resource Concern(s)

Field Name	Acres	Resource Concern(s)
No Data	No Data	No Data

ANALYSIS OF IRRIGATION PRACTICES

Irrigation Management

Proper irrigation management depends on factors such as the following.

Irrigation Efficiency: The efficiency with which the irrigation wets the entire crop root zone. This takes losses that occur from evaporation, runoff and deep percolation.

Crop Evapotranspiration Rate (ET): The combined rate at which water from the soil profile is evaporated into the atmosphere and transpired from the crop. The rate is expressed in units of inches/day.

Management Allowable Depletion (MAD): The percentage of water, which can be depleted from the soil before the crop, experiences water deficiency stress.

Available Water Holding Capacity in the Soil (AWH): The amount of water the pores in the soil profile can hold against gravity. The AWH is expressed as inches of water per inch of soil.

Crop Rooting Depth: The depth in the soil profile to which the crop roots can penetrate.

			Surface Irrigation	1 Summary			
			Field Name: F	Pasture I			
Date of	Initial Irrigation:						
Current	_		Pasture, Irrigated So Condition Roo	outh ID - Good ot Depth 4 feet			
Furtow	Flow Rate			.0	gpm		
Deliver	y Method			N/A			
Furrow	Length			.0	ft		
Furrow	Spacing			.0	ft		
Time to	Reach End of Fu	rrow		.0	hours		
Month	Days Between Irrigation	Set Time (hours)	Irrigation Application Efficiency	Water Applied (in)			Runoff Index
Mar	.0	.0	.0	.0		.0	.0
Apr	.0	.0	.0	.0	1.7	.0	.0
May	.0	.0	.0	.0	3.0	.0	.0
Jun	.0	.0	.0	.0	4.5	.0	.0
Jul	.0	.0	.0	.0	6.5	.0	.0
Aug	.0	.0	.0	.0	5.5	.0	.0
Sep	.0	.0	.0	.0	3.0	.0	.0
Oct	.0	.0	.0	.0	1.3	.0	.0

Appendix A: ANALYSIS OF SOIL CHARACTERISTICS

Soil Survey (USDA NRCS) information was used to describe the soil variations across each field. This is not absolute and may vary for each specific situation. The soil map has broad areas that have distinctive pattern of soils, relief, and drainage. Each map unit on the soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. Because the minor soils are not described in the following summary, the combined acreage for all major soils will be less than the acreage for each field.

Table 1. Soil type across each field

Field Name	Soil Type	Percentage	Approximate Acreage	Surface Texture ¹	
Pasture 1	TIMMERMAN	90	23.42	SL	
	BRAMWELL	80	106.52	SICL	
	DORS	50	0.85	FSL	
	LORAY	30	0.51	GR-FSL	
	GRANDVIEW	80	43.81	L	
"	MAZUMA	75	6.89	FSL	
	BRAM	85	8.46	SIL	
	ROYAL	80	26.52	FSL	
	TYPIC TORRIORTHENTS	60	0.08	ST-SL	
	WATER	100	7.1	:: II <u>B</u>	
1 1	ROCK OUTCROP	40	0.1		
Pasture 2	MAZUMA	75	30.89	FSL	
	DORS	50	7.94	FSL	
	LORAY	30	4.76	GR-FSL	
	GRANDVIEW	80	26.1	, L	
	HAWSLEY	75	0.27	LS	

Note: 1- See Appendix A.

Table 2 contains important soil characteristics for each of the fields identified in this plan. Each soil characteristic listed is representative for the entire field based on a weighted average. (Caution: USDA NRCS Soil Survey information was used to estimate the values reported in Table 2. These are not absolute values and may vary for each specific situation. They are estimated values representative for each field.) The following includes a brief description of each of those factors:

Dominant Surface Texture -- The predominant texture of the surface layer. Soil texture is the relative proportion, by weight, of the particle separate classes (sand, silt, and clay) finer than 2 mm in equivalent diameter. Soil texture influences engineering works and plant growth and is used as an indicator of how soils formed. (See Appendix A)

Available Water Capacity (AWC) -- The volume of water that should be available to plants if the soil, inclusive of fragments, were at field capacity. It is commonly defined as the difference between the amount of soil moisture at field capacity and the amount at permanent wilting point. Typical Available Water Capacities are 0.6 inches/foot for a Sand and 2.0 inches/foot for a Silt Loam. Available Water Capacity is an important soil property in developing water budgets, predicting droughtiness, designing and operating irrigation systems, designing drainage systems, protecting water resources, and predicting yields.

Surface Soil Erodibility Factor (K) -- A factor which quantifies the susceptibility of soil detachment by water. Factors vary from a low of 0.02 to a high of 0.64.

Soil Loss Tolerance (T) -- The maximum amount of erosion at which the quality of a soil as a medium for plant growth can be maintained.

Slope -- The difference in elevation between two points expressed as a percentage of the distance between those points.

Permeability -- The quality of the soil that enables water or air to move through it.

Permeability Class -- Permeability expressed by classes ranging from very rapid to impermeable. (See Appendix A)

Runoff Class - An index of the likelihood for runoff to occur based on inherent soil and slope characteristic. Runoff classes range from Negligible to Very High. (See Appendix A)

Surface pH -- A numerical expression of the relative acidity or alkalinity of the surface soil layer.

Surface pH Classification -- A general descriptive term for soil pH, acid or alkaline.

Table 3 contains additional important soil characteristics for each of the fields identified in this plan. Each soil characteristic listed represents a potential limiting condition within the soil profile (< 5 feet) across the field. (Caution: USDA NRCS Soil Survey information was used to estimate the values reported in Table 2. These are not absolute values and may vary for each specific situation. They are estimated values representative for each field.) The following includes a brief description of each of those factors:

Soil Layer with > 50 % Gravel, Cobble or Stone -- A layer comprised of more than 50 % gravel, cobbles or stones.

Pan - A compact, dense layer in the soil that impedes the movement of water and the growth of roots. Examples include *hardpan*, *claypan*, *plowpan*, and *Fragipan*. (See Appendix A)

Rock -- A layer of rock in the soil that impedes the movement of water and the growth of roots.

Seasonal High Water Table -- A seasonal water table that exist near the surface.

Drainage Class - Drainage class identifies the natural drainage condition of the soil. It refers to the frequency and duration of wet periods. Alteration of the water regime by humans, either through drainage or irrigation, is not a consideration unless the alterations have significantly changed the morphology of the soil. (See Appendix A)

Hydrologic Group -- A group of soils having similar runoff potential under similar storm and cover conditions.

Table 2. Soil characteristics representative for each field

Field		Representative For Entire Field (Weighted Average)												
Name								Permeability (in/hour)	Permeability Class ^{1,2}	Runoff Class ^{1,3}	Surface pH	Surface pH Classification		
Pasture i	SICL(133.14)	9.8	0.37	5	-1	-t	1.23	1.16	Moderate	L	8.14	Alkaline		
Pasture 2	FSL(51.11)	8.2	0.3	5	-t	-1	2.02	2.65	Moderately Rapid	ĽV	8,14	Alkaline		

NOTES:

- 1 See Appendix A;
- 2 PERMEABILITY CLASSES: VR = Very Rapid, R = Rapid, MR = Moderately Rapid, M = Moderate, MS = Moderately Slow, S = Slow, VS = Very Slow, I = Impermeable;
- 3 RUNOFF CLASS: N = Negligible, LV = Very Low, L = Low, M = Medium, H = High, HV = Very High;

Table 3. Soil characteristics that represent a potential limiting condition within the soil profile (< 5 feet) across the entire field.

Field Name	Depth to Limiting Lay	rer < 5 (i	eet - Soil Layer with >	50 % 0						
	Dominant Condit	ion,	Most Limiting Condition			Dominant Condition		Most Limiting Condition		Condition
	Layer Description ^{1,2}	Acres	Layer Description 1,2	Acres	Minimum Depth (in)	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)
Pasture 1	None Present	272.89	GRX	0.59	13	No Pan Present	274.46	No Pan Present	274.46	0
Pasture 2	None Present	74.17	GRX	5.95	13	No Pan Present	90.05	No Pan Present	90.05	0

Field Name	1	Limiting Layer < 5 feet	= 21	Depth to Limiting Layer < 5 feet - Seasonal High Water Table						
1	Dominant Conditi	00	Most Limiting Condition			Dominant Condition	Otta	Most Limiting Condition		
	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)
Pasture I	No Rock Layer Present	274.32	No Rock Layer Present	0,14	N/A	No Water Table Present	198.88	No Water Table Present	133.14	2
Pasture 2	No Rock Layer Present	90.05	No Rock Layer Present	90.05	N/A	Water Table Present	57.43	Water Table Present	32.62	3.5

Field Name			Hydrologic Group ^t			
	Dominant Drainage Class	Acres	Dominant Hydrologic Group	Acres		
Pasture 1	Somewhat poorly drained	143.1	С	199.02		
Pasture 2	Well drained	57.06	В	57.06		

NOTES:

- 1 See Appendix A;
- 2 GRAVEL, COBBLE, or STONE: GRV = Very Gravelly, GRX = Extremely Gravelly, CBV = Very Cobbly, CBX = Extremely Cobbly, STV = Very Stony, STX = Extremely Stony, WB = Weathered Bedrock, and UWB = Unweathered Bedrock;
- 3 DRAINAGE CLASS: E = Excessively drained, SE = Somewhat Excessively drained, W = Well drained, MW = Moderately Well drained, SP = Somewhat Poorly drained, P = Poorly drained, VP = Very Poorly drained;

ANALYSIS OF SOIL CHARACTERISTICS Legend

Soil Pan

Hardpan – A hardened or cemented layer soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Claypan – A slowly permeable soil horizon that contains much more clay than the horizon above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Plowpan – A compacted layer formed in the soil directly below the plow layer.

Fragipan – A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restrict roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than deform slowly.

Soil Drainage Class

Excessively drained (E). Water is removed very rapidly. The occurrence of internal free water commonly is very rare or very deep. The soils are commonly coarse-textured and have very high hydraulic conductivity or are very shallow. They are not suited to crop production unless irrigated.

Somewhat excessively drained (SE). Water is removed from the soil rapidly. Internal free water occurrence commonly is very rare or very deep. The soils are commonly coarse-textured and have high saturated hydraulic conductivity or are very shallow. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained (W). Water is removed from the soil readily but not rapidly. Internal free water occurrence commonly is deep or very deep; annual duration is not specified. Water is available to plants throughout most of the growing season in humid regions. Wetness does not inhibit growth of roots for significant periods during most growing seasons.

Moderately well drained (MW). Water is removed from the soil somewhat slowly during some periods of the year. Internal free water occurrence commonly is moderately deep and transitory through permanent. The soils are wet for only a short time within the rooting depth during the growing season, but long enough that most mesophytic crops are affected. They commonly have a moderately low or lower saturated hydraulic conductivity in a layer within the upper 1 m, periodically receive high rainfall, or both.

Somewhat poorly drained (SP). Water is removed slowly so that the soil is wet at a shallow depth for significant periods during the growing season. The occurrence of internal free water commonly is shallow to moderately deep and transitory to permanent. Wetness markedly restricts the growth of mesophytic crops, unless artificial drainage is provided. The soils commonly have one or more of the following characteristics: low or very low saturated hydraulic conductivity, a high water table, additional water from seepage, or nearly continuous rainfall.

Poorly drained (P). Water is removed so slowly that the soil is wet at shallow depths periodically during the growing season or remains wet for long periods. The occurrence of internal free water is shallow or very shallow and common or persistent. Free water is commonly at or near the surface long enough during the growing season so that most mesophytic crops cannot be grown, unless the soil is artificially drained. The soil, however, is not continuously wet directly below plow-depth. Free water at shallow depth is usually present. This water table is commonly the result of low or very low saturated hydraulic conductivity of nearly continuous rainfall, or of a combination of these.

Very poorly drained (VP). Water is removed from the soil so slowly that free water remains at or very near the ground surface during much of the growing season. The occurrence of internal free water is very shallow and persistent or permanent. Unless the soil is artificially drained, most mesophytic crops cannot be grown. The soils are commonly level or depressed and frequently ponded. If rainfall is high or nearly continuous, slope gradients may be greater.

Soil Hydrologic Group

Group A – Soils that have low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands and gravels. These soils have a high rate of water transmission (greater than 0.30 in/hr).

Group B – Soils that have moderate infiltration rates when thoroughly wetted. They consist chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission (greater than 0.15 - 0.30 in/hr).

Group C – Soils that have low infiltration rates when thoroughly wetted. They consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine texture. These soils have a low rate of water transmission (greater than 0.05 - 0.15 in/hr).

Group D – Soils that have high runoff potential. They have very low infiltration rates when thoroughly wetted. They consist chiefly of clay soils with high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over impervious material. These soils have a very low rate of water transmission (greater than 0.0 - 0.05 in/hr).

Soil Permeability Class

Very Rapid: 20.0 to 100.0 inches/hour

Rapid: 6.0 to 20.0 inches/hour

Moderately Rapid: 2.0 to 6.0 inches/hour

Moderate: 0.6 to 2.0 inches/hour Moderately Slow: 0.2 to 0.6 inches/hour

Slow: 0.06 to 0.20 inches

Very Slow: 0.0015 to 0.06 inches/hour

Impermeable: 0.0000 to 0.0015 inches/hour

Soil Texture Modifiers, Texture Class and Terms Used in Lieu of Texture.

Texture Mo	difiers		re Class	
ASHY Ash	у	C	Clay	
	ldery	CL	Clay loam	
BYV Ver	y bouldery	COS	Coarse sand	i
BYX Ext	remely bouldery	COSL	Coarse sand	ly loam
CB Cob	bly	FS	Fine sand	
CBV Ver	y cobbly	FSL	Fine sandy	loam
CBX Ext	remely cobbly	L	Loam	
CN Cha	nnery	LCOS	Loamy coar	rse sand
CNV Ver	y channery	LFS	Loamy fine	sand
CNX Extr	remely channery	LS	Loamy sand	
COP Cop	rogenous	LVFS	Loamy very	fine sand
DIA Diat	tomaceous	S	Sand	
FL Flag	gy	SC	Sandy clay	
FLV Ver	y flaggy	SCL	Sandy clay	loam
FLX Extr	emely flaggy	SI	Silt	
GR Grav	velly	SIC	Silty clay	
GRC Coa	rse gravelly	SICL	Silty clay lo	am
GRF Fine	gravelly	SIL	Silt loam	
GRM Med	lium gravelly	SL	Sandy loam	ı .
GRV Ver	y gravelly	VFS	Very fine sa	and
GRX Extr	emely gravelly	VFSL	Very fine sa	andy loam
GS Gras	ssy			
GYP Gyp	siferous			
HB Herl	oaceous			
HYDR Hyd				
MEDL Med				
MK Muc	•			
MR Mar	•			
MS Mos				
	bouldery			
	y Parabouldery			
	emely Parabouldery			
PCB Para	-			
	/ Paracobbly			
	emely Paracobbly			
PCN Para				
	Parachannery			
	emely Parachannery			
	nanently frozen			
PFL Para				
PFLV Very				
	emely Paraflaggy			
PGR Para				
	Paragravelly			
	emely Paragravelly			
PST Para	•			
PSTV Very	rarasiony			

Bedrock BR BY **Boulders** CB Cobbles CN Channers DUR Duripan FL Flagstones G Gravel HPM Highly Decomposed plant material MAT Material MPM Moderately Decomposed plant mate Mucky peat MPT **MUCK Muck** OR Ortstein **PBY Paraboulders** PC Petrocalcic **Paracobbles** PCB PCN **Parachanners** PEAT Peat PF Petroferric **Paraflagstones** PFL PG Paragravel Petrogypsic **PGP** PLPlacic **PST Parastones** SPM Slightly Decomposed plant material

Stones

Water

ST W

Terms used in lieu of texture

PSTX Extremely Parastony

PT Peaty ST Stony

STV Very stony

STX Extremely stony

WD Woody

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Pasture 1

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application MethodRating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject >

2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 73.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: Very High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Pasture 2

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application RateRating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 73.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Rating: Medium

Rating: Very High

Rating: Low

Rating: Very High

Rating: Very Low or N.A.

Manure Phosphorus Application Method

Rating: Very High

Manure Application Method: Surface applied no incorporation w/o containment

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc.

Irrigation Runoff Index (Irrigated)

Comments: Reduce surface irrigation flows and/or field slope; or capture tail-water and use a pumpback to reapply tail-water; or if possible and appropriate convert to sprinkler irrigation.

Surface Irrigation or Overhead Irrigation

Comments: No Data

Runoff Best Management Practices

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Pasture 1

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether

adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Rating: Very High

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pumpback System will help to reduce or eliminate runoff. An additional

water Recovery & Pumpback System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: Pasture 2

Overall Risk Rating: Very High

Leaching losses are likely contributing to soluble nutrient leaching below the root zone during most years. Nutrient management practices must be intense.

Percolation

Rating: Very High

Deep Percolation (as % of Evapotranspiration): >40% Over ET

Comments: High potential for soluble nutrient leaching to occur. Nitrogen losses from denitrification will probably occur. Apply water according to crop requirements. Do not apply nitrogen prior to leaching events. Water logging and poor soil aeration may negatively affect crop yields (in some areas of field).

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pumpback System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Rating: Very High

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

NUTRIENT RISK ANALYSIS Legend

BMP	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing	This practice reduces soil erosion,

and maintaining a protective cover

associated sedimentation, improves

of perennial vegetation on land retired from agriculture production. water quality, and creates or enhances wildlife habitat.

Conservation Cropping Sequence

Growing crops in a recurring sequence on the same field.

This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.

Contour Farming

Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)

To reduce erosion and control water.

Cover and Green Manure Crop

A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.

To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.

Critical Area Planting

Planting vegetation on critically eroding areas that require extraordinary treatment.

This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil

and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized planting techniques and management.

Dike or Berm

An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.

Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.

Diversion

A channel constructed across the slope with a supporting ridge on the lower side.

To divert excess water from one area for use or safe disposal in other areas.

Drip Irrigation

A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.

To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.

Filter Strip

A strip or area of vegetation for removing pollutants water.

A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.

Fish Stream Improvement

Fish Stream Improvement is improving a stream channel to make or enhance fish habitat. The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.

Grade Stabilization Construction

A structure used to control the grade and head cutting in natural or artificial channels.

These structures are to: Stabilize the grade and control erosion in natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.

Grassed Waterway

A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.

Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.

Grazing Land Mechanical Treatment

Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.

This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.

Heavy Use Area Protection Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures. To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.

Irrigation Land Leveling

Reshaping the surface of land to be irrigated to planned grades.

To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.

Irrigation Water Management Irrigation water management is the process of determining and controlling the volume, frequency,

Irrigation water management is applied as part of a conservation management system to support one

and application rate of irrigation water in a planned, efficient manner.

or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion; Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.

Mulching

Applying plant residues or other suitable materials not produced on the site to the soil surface.

To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.

Polyacrylamide (PAM)

Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water. Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.

Prescribed Grazing

Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.

Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to:

1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.

Residue Management (Conservation Tillage)

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.

This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve

soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.

Riparian Forest Buffer

A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.

The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.

Sediment Basin

A basin constructed to collect and store debris or sediment.

A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

Sprinkler System

A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure. To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.

Stream Channel Stabilization

Stabilizing the channel of a stream with suitable structures.

To control aggradation or degradation in a stream channel.

Stream bank Protection

Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion. To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.

Strip-cropping, Contour

Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or closegrowing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.

To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.

Strip-cropping, Field

Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a closegrowing crop is alternated with a clean-tilled crop or fallow.

To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.

Subsurface Drains

A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.

The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.

Surge Irrigation

Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.

Surge allows a lighter application of water with a higher efficieciency. The result is less deep percolation of water at the upper end of the field and a more uniform application.

Tail water Recovery & Pumpback System

A facility to collect, store, and transport irrigation tail water for reuse in a farm irrigation distribution system.

To conserve farm irrigation water supplies and water quality by collecting the water that runs off the field surface for reuse on the farm.

Terraces

An earth embankment, a channel, or a combination ridge and channel constructed across the slope.

Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.

Use Exclusion

Excluding animals, people or vehicles from an area.

To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.

Water and Sediment Control Basin An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form sediment trap and water detention basin.

To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.

Watering Facility

A device (tank, trough, or other watertight container) for providing animal access to water.

To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water

supplies from contamination by providing alternative access to water.

Wetland Development/Restoration The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland. To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Pasture, Irrigated South ID - Good Condition Root Depth 4 feet

Lack of adequate fertilizer, improper irrigation management, poor stands, non-adapted plant species and poor grazing management are the major causes of low forage production in irrigated pastures. When properly managed, pastures will respond to fertilization and produce large quantities of high-quality forage and livestock products. Irrigated pastures are typically composed either of grass-legume mixtures or grasses alone. The composition of the pasture can be changed by fertilizer management and grazing method. Adapted and high-quality grasses for irrigated pastures include brome grass and orchard grass for well-drained soil, fescue and wheatgrass for saline soils and creeping meadow foxtail and reed canary grass for wet soil. These grasses make excellent summer regrowth. Highest producing grass-legume mixtures usually include one or more of the above grasses with a well-adapted legume variety. An adapted legume variety should have good winter hardiness and resistance to insects and diseases.

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area. Grass pastures have responded well to nitrogen (N) fertilizer applications up to 150 pounds N per acre. The N rate depends upon the length of frost-free growing season and the number of cuttings or grazing periods. Production potential increases as the frost-free growing period is extended. Split applications of N fertilizer maintain a more uniform level of forage production through summer and fall. Broadcast 30 to 50 pounds N per acre per application after each cutting or grazing cycle, and irrigate to move N into the plant root zone. As the amount of legume increases in a grass/legume mixture, the need for N fertilizer decreases. When the legume composes over 60 percent of the mixture, responses from N are limited. Nitrogen applications will reduce the quantity of legume in a mixed species stand. Inoculation of legumes when the stand is established will reduce the need for N fertilization when legumes dominate the stand composition.

PHOSPHORUS

Intensively managed, high-producing pasture may respond to phosphorus (P) fertilization. Grasses generally have a low P requirement, and legumes generally have a high P requirement. Thus, P fertilizer applications tend to encourage legumes. Phosphorus movement in soils is limited, so P fertilizer needs to be placed in the rooting zone. Apply phosphorus during seedbed preparation whenever possible. Top-dress established pastures with P fertilizer, preferably in the fall.

POTASSIUM

Grasses have moderate potassium (K) requirements, and legumes have high K requirements. Idaho soils are usually high in natural K. Irrigation water contains K except in mountain streams. Potassium movement in soils is limited, though not to the same extent as that of phosphorus. Incorporate K during seedbed preparation or broadcast in the fall on established stands.

SULFUR

Sulfur (S) demand is greater for legumes than grasses. Sulfur requirements for grass and legumes will vary with soil texture, leaching losses, S soil test and S content of irrigation water. Apply 30 pounds of S to soil testing less than 10 ppm sulfate-sulfur (S04-S) in the plow layer. Areas irrigated with water from the Snake River and other streams fed by return flow should have adequate S. High rainfall areas, mountain valleys and foothill areas are likely areas for S deficiencies. Sulfur sources

should be carefully selected due to variation in its availability to plants. Elemental sulfur must be converted so sulfate (S04) form by soil micro-organisms before it can be taken up by plants. Conversion of elemental S to S04 may take several months in warm moist soils. Elemental S fertilizers cannot supply adequate levels of S the year of application. However, these elemental S sources can supply considerable S the year after the initial application. Sulfate-sulfur sources are recommended to alleviate deficiencies the year of application.

MICRONUTRIENTS

Deficiencies of micronutrients such as zinc (Zn), copper (Cu), manganese (Mn) and iron (Fe) have not been observed on irrigated pastures in southern Idaho. Grasses and legumes are not sensitive to low levels of micronutrients as are row crops such as beans and corn. Boron (B) deficiencies may be observed on legumes in gravelly textured soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds of B per acre. Do not use higher rates because B is toxic to plants in excessive amounts.

GENERAL COMMENTS

Nitrogen and phosphorus are the elements needed most on Idaho irrigated pastures. Potassium, sulfur, zinc and boron may be needed. Their need is best determined by soil and plant tissue tests.

Legume population in a grass-legume mixture is reduced by nitrogen fertilization and increased by phosphorus and potassium addition when these nutrients are low in the soil.

Forage from properly fertilized grass or mixed grass-legume pastures have higher protein, providing higher quality livestock feed than unfertilized pastures.

Irrigated pastures make good use of sloping land, stony soils and shallow soils which are less desirable for row crops. Pastures reduce soil erosion during irrigation on sloping land.

Fertilizers are only one part of pasture management. Pastures are most profitable when plant selection, irrigation and harvest techniques are not limiting production.

Rotational grazing will provide more forage and greater returns than continuous grazing.

Contact your County Extension Agent if you have any questions regarding the interpretation of this information or for further information on your local needs.

Pasture, Irrigated South ID - Poor Condition Root Depth 2 feet

Lack of adequate fertilizer, improper irrigation management, poor stands, non-adapted plant species and poor grazing management are the major causes of low forage production in irrigated pastures. When properly managed, pastures will respond to fertilization and produce large quantities of high-quality forage and livestock products. Irrigated pastures are typically composed either of grass-legume mixtures or grasses alone. The composition of the pasture can be changed by fertilizer management and grazing method. Adapted and high-quality grasses for irrigated pastures include brome grass and orchard grass for well-drained soil, fescue and wheatgrass for saline soils and creeping meadow foxtail and reed canary grass for wet soil. These grasses make excellent summer regrowth. Highest producing grass-legume mixtures usually include one or more of the above grasses with a well-adapted legume variety. An adapted legume variety should have good winter hardiness and resistance to insects and diseases.

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area. Grass pastures have responded well to nitrogen (N) fertilizer applications up to 150 pounds N per acre. The N rate depends upon the length of frost-free growing season and the number of cuttings or grazing periods. Production potential increases as the frost-free growing period is extended. Split applications of N fertilizer maintain a more uniform level of forage production through summer and fall. Broadcast 30 to 50 pounds N per acre per application after each cutting or grazing cycle, and irrigate to move N into the plant root zone. As the amount of legume increases in a grass/legume mixture, the need for N fertilizer decreases. When the legume composes over 60 percent of the mixture, responses from N are limited. Nitrogen applications will reduce the quantity of legume in a mixed species stand. Inoculation of legumes when the stand is established will reduce the need for N fertilization when legumes dominate the stand composition.

PHOSPHORUS

Intensively managed, high-producing pasture may respond to phosphorus (P) fertilization. Grasses generally have a low P requirement, and legumes generally have a high P requirement. Thus, P fertilizer applications tend to encourage legumes. Phosphorus movement in soils is limited, so P fertilizer needs to be placed in the rooting zone. Apply phosphorus during seedbed preparation whenever possible. Top-dress established pastures with P fertilizer, preferably in the fall.

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SULFUR

Sulfur (S) demand is greater for legumes than grasses. Sulfur requirements for grass and legumes will vary with soil texture, leaching losses, S soil test and S content of irrigation water. Apply 30 pounds of S to soil testing less than 10 ppm sulfate-sulfur (S04-S) in the plow layer. Areas irrigated with water from the Snake River and other streams fed by return flow should have adequate S. High rainfall areas, mountain valleys and foothill areas are likely areas for S deficiencies. Sulfur sources should be carefully selected due to variation in its availability to plants. Elemental sulfur must be converted so sulfate (S04) form by soil micro-organisms before it can be taken up by plants. Conversion of elemental S to S04 may take several months in warm moist soils. Elemental S fertilizers cannot supply adequate levels of S the year of application. However, these elemental S sources can supply considerable S the year after the initial application. Sulfate-sulfur sources are recommended to alleviate deficiencies the year of application.

MICRONUTRIENTS

Deficiencies of micronutrients such as zinc (Zn), copper (Cu), manganese (Mn) and iron (Fe) have not been observed on irrigated pastures in southern Idaho. Grasses and legumes are not sensitive to low levels of micronutrients as are row crops such as beans and corn. Boron (B) deficiencies may be observed on legumes in gravelly textured soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds of B per acre. Do not use higher rates because B is toxic to plants in excessive amounts.

GENERAL COMMENTS

Nitrogen and phosphorus are the elements needed most on Idaho irrigated pastures. Potassium, sulfur, zinc and boron may be needed. Their need is best determined by soil and plant tissue tests.

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Forage from properly fertilized grass or mixed grass-legume pastures have higher protein, providing higher quality livestock feed than unfertilized pastures.

Irrigated pastures make good use of sloping land, stony soils and shallow soils which are less desirable for row crops. Pastures reduce soil erosion during irrigation on sloping land.

Fertilizers are only one part of pasture management. Pastures are most profitable when plant selection, irrigation and harvest techniques are not limiting production.

Rotational grazing will provide more forage and greater returns than continuous grazing.

Contact your County Extension Agent if you have any questions regarding the interpretation of this information or for further information on your local needs.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular,

recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldsman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:
 - 1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.
 - 2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.
 - 3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data Date of Test: No Data

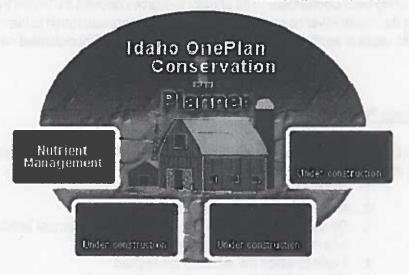
Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
Ec	mmhos	No Data	No Data	

PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	Tagle.
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
Р	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	L
Cu	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	_
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

Grandview Bryant Farm

Nutrient Management Plan

Agriculture . . . Launching into the Future



Nutrient Management Plan Prepared For:

Grandview Farms (208) 834-2231 Bryant Farm

Certified Planner:

Michael Mitchell Professional Engineer, EAC Engineering, Inc (559) 381-0607

Producer Signature:	Certificated Planner Signature:	
	Date Completed: 10-02-07	

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27.17D6)

BRYANT FARM Producer Summary

Farm Summary

Bryant Farm is an existing farm located 8 miles southwest of Mountain Home Air force Base. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of five fields irrigated with handlines for a total of 435.7 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot.

Farm Resource Concerns

Bryant Farm is located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 00'32" 42N 58'26" using GPS Coordinates. The primary resource concerns for Bryant Farm are ground an quality. The farm sits along the Snake River however fields are bermed to prevent runoff to the river therefore runoff is not likely to occur. Solid waste is applied to all of the fields and pasture and incorporated on fields within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

- 1. Fertilizer application rates
- 2. Manure/Compost application rates
- 3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
- 4. Fields to which the nutrients are applied
- 5. Spring soil test for nitrogen (required annually) 0-12" and 12-24" nitrogen test

Crop Nutrient Requirement									
Стор	Pounds of P205 per acres								
Alfalfa	86								
Wheat	66								

Manure/Compost field application requirement (tons)											
A	cres X crop nutrien	t rec	quirement + manure p20	05 value* = Tons required							
Example	Corn - 250(acres)	X	75 (crop requirement)	÷ 16.85							
Com	250	Х	75** = 18750	+ 16.85* = 1112.76 tons							

^{*}based on manure test values for P205

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water

^{**}pounds of p205 required per acre

management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas
 of very shallow soils, and sinkholes.

Bryant Farm ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

- 1) assure proper containment of animal manure and process waste water
- 2) assess resource concerns which exist on the property
- 3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.
- 4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO,) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue). Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1): Grandview Farms

Address: 1301 Hwy 67, Grandview, ID 83624

Phone: (208) 834-2231 N/A

N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation

Bruneau River

District: County:

Elmore

Watershed Basin:

Middle Snake-succor (USGS Hydrologic Unit Code #

17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Bryant Farm is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	ТЕМР	UNKN	•
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	٥	0	0	0	0	0	1	0	0	0	x

Bryant Farm is <u>not</u> located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

<u>Priority 1</u> is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

<u>Priority 2</u> is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Bryant Farm is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

No Resource Concerns -

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Field 13	Cobbles	13
	Fractured Bedrock	20
	Water Table	>72
Field 14	Cobbles	13
	Water Table	>72
Field 15	Cobbles	13
N= = = = =	Water Table	>72
Field 16	Cobbles	13
	Water Table	>72
Field 17	Cobbles	13
	Hard Pan	20
	Water Table	>72

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a

groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshold Soil Test Depth
Field 13	Groundwater < 5'	20	18 - 24"
Field 14	Groundwater < 5'	20	18 - 24"
Field 15	Groundwater < 5'	20	18 - 24"
Field 16	Groundwater < 5'	20	18 - 24"
Field 17	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2336466.23602611, Y = 1308354.00199942

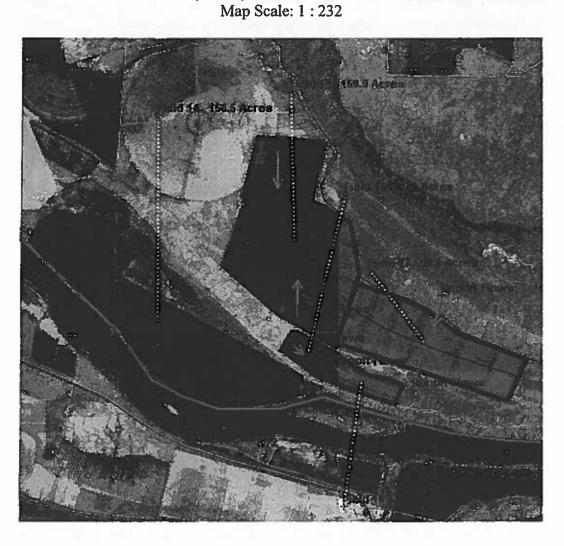


Figure 1. Base Map

Farm Location

 $\underline{\text{Idaho Transverse Mercator}}$ Coordinates of the farm center (meters): X = 2336466.23602611, Y = 1308354.00199942 Map Scale: 1:225

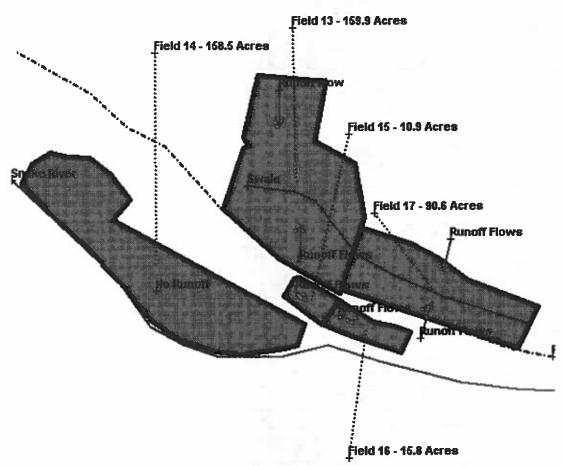


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: Field 13

Name	Man App		Imported Nutrien	Min	eralization	τ	otal
			5 T/ac			Γ	
Potatoes(2004)	Y	N	57	N	0	N	57
· , ,		P	82			P	82
		K	316			K	316
			5 Dac		= 3		
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	57	N	32	N	89
		P	82		1	P	82
		ĸ	316			K	316
			S'T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	57	N	32	N	89
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		P	82			P	82
		ĸ	316			K	316
		-	5 TVac				
Potatoes(2007)	Y	N	57	N	32	N	89
100000(2007)		P	82			P	82
		K	316			K	316

FIELD: Field 14

Name	Мял Арр		Imported Nutrien	Mines	alization	T	otal	
			5 Trac				Г	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	59	N	0	Z	59	
,		P	86	133	350	P	86	
		K	330			K	330	
			5 T/ac				-	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	59	N	33	N	92	
		P	86			P	86	
		K	330		国	K	330	
			5 T/ac					
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	59	N	33	N	92	
		P	86			P	86	
		ĸ	330			K	330	
			5 Time		7.00.0			
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	59	N	33	N	92	
	manufi and manufacture and		P	86		450	P	B6
		ĸ	330	Rail I	Part of	K	330	

FIELD: Field 15

Name	Man App		Imported Nutrient	Miner	alization	T	otal
			Sattle				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	V I	N	59	N	0	N	59
,,		P	86		1	p	86
		K	330			ĸ	330
			\$ T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)		N	59	N	33	Z	92
		P	86			P	86
		K	330			K	330
			S*D/ac -		240	i	
Alfalfa Hay, Irrigated South ID-Cut Mid Bioom(2006)	Ιγ	N	59	N	33	Z	92
		P	B6			P	86
		ĸ	330			ĸ	330
THE RESERVE			5 Tilec	-			
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	Z	59	N	33	Ν	92
(P	86			P	86
11 M		ĸ	330		Will.	ĸ	330

FIELD: Field 16

Name	Man Ap	m	Imported Nutries	Miner	alization	т	otal
		T	≤ T/ac			-	Г
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	K	59	N	0	Z	59
		P	86		37	P	86
		K	330			K	330
			5 Trac				Г
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	59	N	33	Z	92
	`	P	86	7	200	P	86
		K	330		1	ĸ	330
		T	5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	59	N	33	ž	92
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		P	B6			P	86
H- 462 II II II-		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)		I	5 Trac				
	Y	N	59	N	33	z	92
		F	86			P	86
		K	330			K	330

FIELD: Field 17

Name	Man Ap	P	Imported Nutries	Min	eralization	┥╸	otal
		T	4 This			T	Г
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	50	N	0	N	50
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(200-	_	P	73		CAR	P	73
W-27		k	279			ĸ	279
Wheat-Winter, Irrigated South ID(2005)	Y	T	#AT/sic			Γ	Γ
		F	50	N	127	N	177
		P	73	100	192.5	P	73

		к	279			K	279
Potatoes(2006)			4/D/ac			T	
	Y	N	50	N	-10	N	40
	·	P	73			P	73
		К	279		10/15	к	279
			4 The			Τ	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	50	N	28	N	78
sales any, angues some 22-on rate storing over,	٠	P	73			P	73
		К	279		200	K	275

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	396

The acreage in the table is based on an average crop uptake of 100 lbs P₂O₅ per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Division of Animal Industries.

Hydraulic Balance

Field	Date
Field 13	April 15
Field 14	April 1
Field 15	May 1
Field 16	May 1
Field 17	April 1

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test

Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Field 13 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	32		
from Irrigation Water	0		0
Nutrient Balance from above	333.8	85.9	351
Imported Nutrients	57	82	316
Estimated Remaining Nutrients Required	277	4	35
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	277	4	35

Acceptable: Sustainable agronomic rate.

Field: Field 14 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required		0	22
Commercial Fertilizer Application		0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: Field 15 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	Ŋ	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?	R	
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0

Nutrient Balance from above		85.9	351
Imported Nutrients		86	330
Estimated Remaining Nutrients Required		0	22
Commercial Fertilizer Application		0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: Field 16 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above		85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required		0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: Field 17 Crop: Wheat-Winter, Irrigated South ID Yield: 120

	N	P205	K20
Crop Nutrient Requirement	240	66	45
Nutrients From Soil	?	WEST.	
from Mineralized Nitrogen	45		
from Prior Crops	54		
from Prior Bio-Nutrients	28		
from Irrigation Water Nutrient Balance from above			0
		66	44.9
Imported Nutrients	50	73	279
Estimated Remaining Nutrients Required	64	-7	-234
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	64	-7	-234

Unacceptable Rate: May be a resource risk. Acceptable: Sustainable agronomic rate.

Appendix B: NUTRIENT RISK ANALYSIS

FIELD: Field 13

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 82.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Rating: Low

Distance to Surface Water Body: 0.3

Comments: Consider eliminating runoff by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 14

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P

Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Rating: Very Low or N.A.

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 15

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is

successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except

for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Rating: High

Distance to Surface Water Body: 0.1

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 16

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Rating: Very Low or N.A.

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P

levels.

Manure Phosphorus Application Method

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Surface Irrigation or Overhead Irrigation

Comments: No Data

Runoff Best Management Practices

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Distance to Surface Water Body: 0.1

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 17

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P

Soil Test Depth: 18-24"

Rating: Very High

Rating: Medium

Rating: High

Rating: Very Low or N.A.

Rating: Very Low or N.A.

Rating: Low

Rating: High

Rating: Critical

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soil annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 72.7

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Rating: Medium

Distance to Surface Water Body: 0.2

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Field 13

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 14

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 15

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface

transport to ground water and interconnected surface water may be a concern.

FIELD: Field 16

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 17

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

NUTRIENT RISK ANALYSIS Legend

ВМР	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover of perennial vegetation on land	This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or

retired from agriculture production.

enhances wildlife habitat.

Conservation Cropping Sequence

Growing crops in a recurring sequence on the same field.

This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.

Contour Farming

Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)

To reduce erosion and control water.

Cover and Green Manure Crop

A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.

To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.

Critical Area Planting

Planting vegetation on critically eroding areas that require extraordinary treatment.

This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized

planting techniques and management.

Dike or Berm

An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.

Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.

Diversion

A channel constructed across the slope with a supporting ridge on the lower side.

To divert excess water from one area for use or safe disposal in other areas.

Drip Irrigation

A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.

To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.

Filter Strip

A strip or area of vegetation for removing pollutants water.

A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.

Fish Stream Improvement

Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.

The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.

Grade Stabilization Construction

A structure used to control the grade and head cutting in natural

These structures are to: Stabilize the grade and control erosion in

or artificial channels.

natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.

Grassed Waterway

A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.

Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.

Grazing Land Mechanical Treatment Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.

This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.

Heavy Use Area Protection Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures. To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.

Irrigation Land Leveling

Reshaping the surface of land to be irrigated to planned grades.

To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.

Irrigation Water Management Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.

Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion;

Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.

Mulching

Applying plant residues or other suitable materials not produced on the site to the soil surface.

To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.

Polyacrylamide (PAM)

Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.

Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.

Prescribed Grazing

Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.

Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to:
1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.

Residue Management (Conservation Tillage)

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.

This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.

Riparian Forest Buffer

A riparian forest buffer is an area

The riparian forest buffer is a

of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.

multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.

Sediment Basin

A basin constructed to collect and store debris or sediment.

A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

Sprinkler System

A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure. To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.

Stream Channel Stabilization

Stabilizing the channel of a stream with suitable structures.

To control aggradations or degradation in a stream channel.

Stream bank Protection

Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion. To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander

that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.

Strip-cropping, Contour

Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or closegrowing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.

To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.

Strip-cropping, Field

Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a closegrowing crop is alternated with a clean-tilled crop or fallow.

To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.

Subsurface Drains

A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.

The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.

Surge Irrigation

Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.

Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the field and a more uniform application.

Tailwater Recovery & Pumpback System

A facility to collect, store, and transport irrigation tailwater for

To conserve farm irrigation water supplies and water quality by

reuse in a farm irrigation distribution system.

collecting the water that runs off the field surface for reuse on the farm.

Terraces

An earth embankment, a channel, or a combination ridge and channel constructed across the slope.

Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.

Use Exclusion

Excluding animals, people or vehicles from an area.

To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.

Water and Sediment Control Basin An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.

To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.

Watering Facility

A device (tank, trough, or other watertight container) for providing animal access to water.

To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.

Wetland Development/Restoration The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland. To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S.

Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculated the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0-to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct a S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes, and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops would have sufficient residual for alfalfa.

BORON

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do no use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the regrowth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition. Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however. Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage. Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

Potatoes NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Most Idaho potato fields will respond to fertilizer nitrogen (N). The N rate used, along with other management factors, particularly irrigation, can have a marked effect on the yield and quality of the potato crop.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical potato yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward.

Research has shown that the available N required to produce a good potato yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by potatoes for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are

restricted by dense soil layers or high water tables. Ammonium is generally low in preplant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition.

Consequently, these residues have little effect on the N needs of potatoes.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which potatoes are grown rarely receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to potatoes. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system. Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =

(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizer recommendations are for Russet Burbank potatoes grown on sandy loam soils. Adjustments are made for very sandy soils (add 30 lb N/acre) and silt loam soils (subtract 40 lb N/acre) to account for differences in nitrogen mineralization rates and nitrogen use efficiency. To maximize yield and quality, growers should aim to have about 40 to 45% of their total N supply applied by row closure. Nitrogen applications made during tuber bulking should be guided by petiole sampling to maintain at least 15,000 ppm N03-N in the fourth petiole from the growing tip.

Excess levels of soil N at or before tuberization can delay tuber growth, reduce yields and lower tuber specific gravity. Excess N in late summer and fall can delay maturity of the tubers. This delayed tuber maturity can adversely affect tuber storability and quality.

The N needs of the potato crop are best met by split-application of N fertilizer. This involves applying lower rates of N fertilizer preplant and at planting, with the remainder of the crop's N needs applied with the irrigation water. Some cropping systems - for example, furrow irrigation - make it difficult to apply N fertilizer and get efficient plant uptake. Under these conditions most of the crop N needs are applied to the soil before planting.

Nitrogen applied with irrigation water is an effective way to supplement the crop during the growing season. Do not use aqua or anhydrous ammonia in sprinkler system applications. Applications through a sprinkler system are not folar fertilization.

PHOSPHORUS

Potato plants need phosphorus (P) for plant growth and will respond to P fertilizer if the soil test concentration is low. Phosphorus soil test for potatoes is based on an extraction with sodium bicarbonate. Soil samples for a phosphorus soil test should be taken from 0- to 12-inch depths. This depth of sampling is critical to achieve an accurate soil test P level. Deviation in sampling depth from the 12-inch depth may drastically alter soil test results.

Phosphorus is immobile in soil and therefore does not move from where it is placed. Applied P fertilizer must be mixed into the seedbed before planting for best results. Banding P fertilizer along side plants has not been as effective as P fertilizer that has been broadcast and incorporated. Eroded or scraped areas, commonly referred to as "white soil" areas, may be low in available P because of its high content of "free lime." These areas should be tested and fertilized separately. To compensate for low P availability when free lime is present in the soil, rates of P are increased with increasing levels of free lime. Total phosphorus concentrations should be kept above 0.22% in the fourth petiole during tuber bulking.

POTASSIUM

Potatoes require high levels of available potassium (K). Potassium is relatively immobile in the soil. For best results, K fertilizers should be applied preplant and mixed into the seedbed. Banding beside the plants has been used successfully but is not as effective as K fertilizer which has been broadcast and incorporated. Potassium fertilizer applications reduce specific gravity of harvested tubers. Potassium chloride fertilizer (KCl or muriate of potash) lowers specific gravity of tubers more than potassium sulfate fertilizer (K2SO4 or sulfate of potash). Growers should avoid over-fertilization of potatoes with K fertilizers. When specific gravity of tubers is important, potassium sulfate is the preferred K fertilizer source. Total potassium concentrations should be kept above 7.0% in the fourth petiole during tuber bulking.

Potatoes generally do not respond to sulfur (S) fertilization. Sulfur response is most likely to occur in sandy soils and in areas where irrigation water sources are low in S. Water low in S includes mountain streams and some well waters. The more irrigation return-flow in the water source the greater the amount of dissolved, plant-available sulfate (S04) form. Elemental sulfur is not recommended because it is not immediately available to plants. Elemental sulfur will require several months from time of application until it is converted to plant-available form.

MICRONUTRIENTS

"Shotgun" application of micronutrients - I.e. complete mixes containing boron (B), copper (Cu), iron (Fe), manganese (Mn) and zinc (Zn) - "for insurance" are not recommended since these elements have not been shown to give an economical response. Soil tests for individual micronutrients are available and concentrations in the 0- to 1-inch soil sample are: B = 0.5 ppm, Cu = 0.2 ppm, Fe = 4.0 ppm, Mn = 2.0 ppm, Zn = 0.5 ppm. Critical concentrations represent values below which a response from the application of that micronutrient may be obtained.

Zinc deficiencies have not been widespread on potatoes although some crops in certain areas of southern Idaho do show a Zn deficiency. When the soil test for Zn is below the critical concentration or where land leveling or erosion has exposed white subsoil containing free lime, apply Zn fertilizer at a rate which will supply 10 pounds of Zn per acre or equivalent. This amount of Zn should be sufficient for 4 to 6 years of crop production.

GENERAL COMMENTS

The P, K, and Zn nutritional status of the plant should also be monitored during the growing season. The same petiole sample used for N03-N concentrations can also be used for this purpose. Guidelines for adequate concentrations of these and other nutrients in the petiole can be obtained from your county agricultural Extension agent, consultant, or fieldman.

Fertilizer materials containing P, K and Zn should be thoroughly incorporated into the root zone. These materials can be effectively applied in the fall.

Wheat-Winter, Irrigated South ID NITROGEN

Adequate nitrogen is necessary for maximum production of irrigated wheat. Nitrogen represents, by far, the largest share of fertilizer costs for wheat in Idaho. The amount of nitrogen required depends on many factors which influence total wheat production and quality. Both yield potential and available nitrogen (N03 = NH4) should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical wheat yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward.

Research has shown that the available N required to produce a bushel of irrigated wheat depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by wheat for maximum yield. The results of irrigated field trials in the Boise and Magic valleys suggest as a rule that 2 pounds available N per bushel of wheat is required for maximum production up to 120 bushels per acre. Above 120 bushels per acre, the factor is somewhat less than two.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or

manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in preplant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications.

A preplant soil sample is often only collected from the first foot of soil. Although this information is not as complete and reliable as would be provided by deeper sampling, residual N measurements from the first foot of soil can be combined with estimates of residual N in the second foot to predict N requirements for irrigated winter wheat. For fall planted winter cereals in western Idaho, preplant soil test N03-N in the second foot of the soil is commonly only one-half to two-thirds as high as in the first foot of soil. However, this estimate may not be accurate after potatoes or other sprinkler irrigated crops, especially in coarser textured soils. Basing N rate recommendations on estimates of residual N in the second foot increases the risk of recommending either too little or too much N.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition.

Consequently, these residues have little effect on the N needs of winter wheat.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which winter wheat is grown occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciable depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to winter wheat. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system. Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =

(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test)
(previous crop/residue management) - (Manure Nitrogen) - Irrigation Water

TIMING OF NITROGEN APPLICATION

Excessive irrigation or heavy winter precipitation can result in leaching of nitrate N beyond the root systems. This hazard exists on all soils, but particularly on coarse textured soils such as sands, and sandy loams. Fall pre-plant N was once thought to be as good or preferable to spring top dressed N in calcareous silt loam or clay soils in areas of low rainfall. However, even under these conditions, southern Idaho research has shown than N applied in late winter or early spring is frequently used more effectively than early fall preplant applied N.

Nitrogen fertilizers containing ammonium (ammonium sulfate, anhydrous or aqua ammonia, or urea) are less subject to leaching losses when lower soil temperatures (less than 40 F) inhibit the microbial conversion of ammonium to nitrate. Lower temperatures also reduce the microbial activity that is responsible for the immobilization of applied N. Late fall, split, or spring applied N is also recommended when residues from previous grain or mature corn crops are returned to the soil in early fall.

Early spring N applications are more effective for increasing grain protein for irrigated hard red winter wheat. Nitrogen applied after the boot stage will contribute more to grain protein than to yield. Most wheat varieties respond in a similar way to N. However, varieties differ in their tolerance of high N rates. High N contributes to lodging of varieties with poor straw strength.

PHOSPHORUS (P)

Wheat requires little phosphorus compared to the P requirements of other crops although minimum soil levels are necessary for maximum production. Adequate P is especially necessary for winter hardiness. Soil tests can indicate whether soils require phosphorus fertilization for maximum wheat production. Soil samples are taken from the 0- to 12-inch depth.

Broadcast plow down, broadcasts seedbed incorporation or drill banding low rates of P with seed are effective methods of application. Drill banding may reduce the fertilizer P required. Drill banding high rates of P, especially ammonium phosphate fertilizers, can cause seedling damage. For more detailed discussion of banding, refer to PNW 283, "Fertilizer Band Location for Cereal Root Access."

POTASSIUM (K)

Wheat has a lower requirement for K compared to sugar beets, corn or potatoes. Soil tests can be useful indicators of the need for K. Potassium should be incorporated during seedbed preparation.

SULFUR (S)

Sulfur requirements for wheat will vary depending on soil texture, previously incorporated crop residues, leaching losses, S content of irrigation water and S soil test. Wheat irrigated with Snake River water should not experience S shortages. Soils low in S (less than 10 ppm S04-S in the plow layer or 8 ppm in the 0- to 12-inch depth) should receive 20 to 40 pounds of S per acre.

Sulfur deficiency appears as a general yellowing of the plant early in the season and looks much like N deficiency. Plant analysis can be a useful means of differentiating between the two deficiencies. An N to S ratio of 17 in whole plant tissues is generally used for diagnosing sulfur deficient wheat. Sulfur deficient wheat has also been known to contain high nitrate nitrogen (N03-N) concentrations.

MICRONUTRIENTS

Micronutrients have not been shown to be limiting wheat production and "shotgun" application of micronutrient mixtures containing boron, manganese, iron and copper "for insurance" have not been shown to be responsive and are not suggested.

GENERAL COMMENTS

Avoid a heavy first irrigation on spring cereals to prevent water logging, reduced tillering and N leaching.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized.

For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:
 - 1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.
 - 2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.
 - 3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data Date of Test: No Data

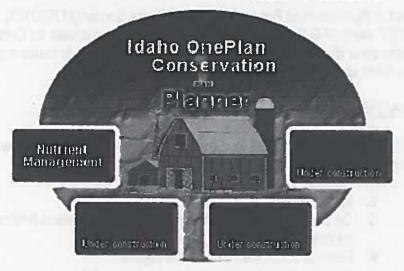
Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
Р	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	

Fe	ppm	No Data	No Data			
Cu	ppm	No Data	No Data			
Ca	ppm	No Data	No Data			
Mg	ppm	No Data	No Data			
Na	ppm	No Data	No Data			

Grandview Collett Farm

Nutrient Management Plan

Agriculture . . . Launching into the Future



Nutrient Management Plan Prepared For:

Grandview Farms (208) 834-2231 Collett Farm

Certified Planner:

Michael Mitchell Professional Engineer, EAC Engineering, Inc (559) 381-0607

Producer Signature:	Certificated Planner Signature:						
	Date Completed: 10-02-07						

The information provided by those using the "Idaho OnePian" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27.17D6)

COLLETT FARM Producer Summary

Farm Summary

Collett Farm is an existing farm located 39 miles south of Boise, Idaho. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of two pivot irrigated fields, two fields irrigated with hand lines and two fields irrigated with linear sprinklers for a total of 527 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot.

Farm Resource Concerns

Collett Farm is located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 07'33" 43N 02'23" using GPS Coordinates. The primary resource concern for Collett Farm is ground water quality. No canals, laterals or ditches with irrigation water are near the fields to cause any type of runoff. Solid waste is applied to all of the fields and incorporated within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

- 1. Fertilizer application rates
- 2. Manure/Compost application rates
- 3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
- 4. Fields to which the nutrients are applied
- 5. Spring soil test for nitrogen (required annually) 0-12" and 12-24" nitrogen test

Crop Nutrient Requirement								
Crop	Pounds of P205 per acres							
Alfalfa	86							
Corn	58							

Manure/Compost field application requirement (tons)										
<u> </u>	cres X crop nutrier	t re	<u>quirement</u> + <u>manure</u> p2	05 value [*] = Tons required						
Example	Corn - 250(acres)	Х	75 (crop requirement)	÷ 16.85						
Corn	250	Х	58** = 14500	+ 16.85* = 861 tons						

^{*}based on manure test values for P205

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is underapplied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

Irrigation schedules continue to be managed by your irrigation specialist.

^{**}pounds of p205 required per acre

 Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas
 of very shallow soils, and sinkholes.

Collett Farm ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

- 1) assure proper containment of animal manure and process waste water
- 2) assess resource concerns which exist on the property
- 3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.
- 4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO,) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue). Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1): Grandview Farms

Address: 1301 Hwy 67, Grandview, ID 83624

Phone: (208) 834-2231 N/A

N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation

Elmore

District: County:

Elmore

Watershed Basin:

Middle Snake-succor (USGS Hydrologic Unit Code # 17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Collett Farm is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES		CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	0_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	•
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	Х

Collett Farm is <u>not</u> located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

<u>Priority 1</u> is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

<u>Priority 2</u> is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Collett Farm is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

No Resource Concerns -

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Field 12	Cobbles	13
	Fractured Bedrock	20
	Water Table	18
Field 13	Cobbles	26
	Water Table	48
Field 14	Cobbles	26
	Water Table	48
Field 15	Cobbles	26
	Water Table	48
Field 16	Cobbles	26
- 2 Andréa - 72	Water Table	18
Field 17	Cobbles	26
	Water Table	18

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No Data	No	No Data	No	No	No	No Data	No	No Data	No Data	No Data	No Data
Data	Data	i	Data	Data	Data	Data	Data				

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the

Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshold Soil Test Depth
Field 12	Groundwater < 5'	20	18 - 24"
Field 13	Groundwater < 5'	20	18 - 24"
Field 14	Groundwater < 5'	20	18 - 24"
Field 15	Groundwater < 5'	20	18 - 24"
Field 16	Groundwater < 5'	20 –	18 - 24"
Field 17	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator
Coordinates of the farm center (meters): X = 2326747.89596434, Y = 1317374.8217659
Map Scale: 1:38



Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2326747.89596434, Y = 1317374.8217659 Map Scale: 1:38

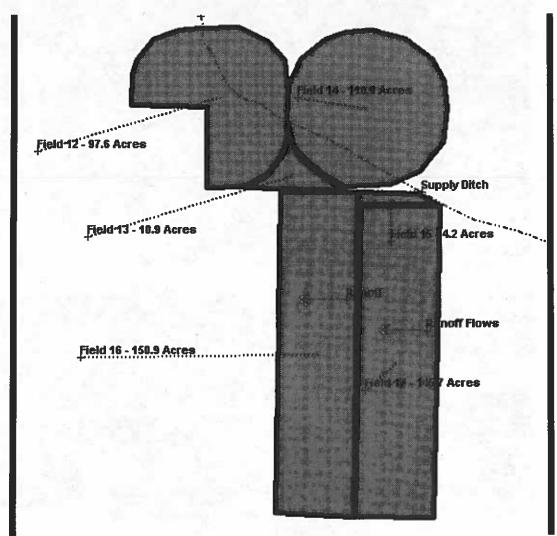


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: Field 12

Name	Man App		Imported Nutrient	Mine	ralization	7	otal
,		Γ	3.77ac			Γ	
Corn-Field Grain, Irrigated South ID(2004)	Y	N	40	N	0	N	40
, ,	-	P	58			P	58
		ĸ	220			K	220
		Γ	3 T/ac				
Corn-Field Grain, Irrigated South ID(2005)	Y	N	40	N	-13	N	27
		P	5B			P	58
		ĸ	220		體質	ĸ	220
			3-T/ac				
Corn-Field Grain, Irrigated South ID(2006)	Y	N	40	N	13	Z	27
		P	58			þ	58
		K	220			ĸ	220
			3 Dac				
Corn-Field Grain, Irrigated South ID(2007)	Y	N	40	N	22	N	62
		P	58			P	58
		K	220			K	220

FIELD: Field 13

Name	Man App	l	Imported Nutrient	Miner	alization	ī	otal
		Γ	5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	l _v	N	59	N	0	N	59
	`	P	86			P	86
		ĸ	330			K	33
		Γ	5 17/ac			П	Г
Alfalfa Hay, frrigated South ID-Cut Mid Bloom(2005)	Y	N	59	N	33	N	92
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		P	86			P	86
		ĸ	330			ĸ	33
		Г	5 Titled				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	59	N	33	N	92
,, ,		P	86		152	P	86
		K	330			K.	330
			5 Tipo				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	Z	59	N	33	N	92
,, ,	<u> </u>	P	86		原催	P	86
		ĸ	330	1		ĸ	33(

FIELD: Field 14

Name	Мап Арр	1	Imported Nutrients	Mine	ralization	T	otal
			3 T/ac				Г
Corn-Field Grain, Irrigated South ID(2004)	V V	N	40	N	0	N	40
		P	58			P	58
		K	220			K	220
			3 T/ac				
Corn-Field Grain, Irrigated South ID(2005)	Y	N	40	N	-13	Ŋ	27
,		P	58			P	58
		ĸ	220	壓	Marie	ĸ	220
			,3/T/et				
Corn-Field Grain, Irrigated South ID(2006)	Y	N	40	N	-13	N	27
		P	58		P. St.	P	58
		K	220			K	220
			3 T/lec				
Corn-Field Grain, Irrigated South ID(2007)	Y	N	40	N	22	Z	62
		P	58			P	58
		K	220	100		K	220

FIELD: Field 15

Name	Мав Арр		Imported Nutrient	Miner	alization	Т	otal
			5 T/ac			T	Γ
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	y	N	59	N	0	Й	59
,		P	86	1		P	86
		ĸ	330			ĸ	330
·			5 T/pc				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	59	N	33	N	92
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		P	86		34	P	86
,		κ	330			ĸ	330
			6 The				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	59	N	33	N	92
		P	86	200		P	B 6
		ĸ	330			K	330
			5 10 ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	Z	59	N	33	N	92
		P	86		5 6	P	86
9		к	330	機宜		ĸ	330

FIELD: Field 16

Name	Man App		Imported Nutrient	s Mine	ralization	т	otal
			2 T/ac				
Corn-Field Grain, Irrigated South ID(2004)	Y	N	22	N	0	N	22
	•	P	32			P	32
		к	124	92		ĸ	124
Corn-Field Grain, Irrigated South ID(2005)	Y		2 Disc				
		N	22	N	-23	N	-1
		P	32		1000	P	32

		К	124			ĸ	124
Corn-Field Grain, Irrigated South ID(2006)			ITac				
	Y	N	22	N	-23	N	-1
	-	P	32			P	32
	_	K	124			K	124
	Υ.,		2 Trac			Τ	
Corn-Field Grain, Irrigated South ID(2007)		N	22	N	12	N	34
ka	• •	P	32	534		P	32
		K	124	93	65	ĸ	124

FIELD: Field 17

Name	Man App		Imported Nutrient	Mine	ralization	1	otal
Corn-Field Grain, Irrigated South ID(2004)		Γ	2 T/ac				
	l _v	N	22	N	0	N	22
	`	P	32			₽	32
		K	124			ĸ	124
Corn-Field Grain, Irrigated South ID(2005)			2 This				
	l _y	Z	22	N	-23	N	-1
		P	32		35.5	P	32
		K	124			K	124
			2.T/ac				
Corn-Field Grain, Irrigated South ID(2006)	Y	Z	22	N	-23	N	-1
,		P	32			P	32
		ĸ	124		40	K	124
· ·			2.Dac				
Corn-Field Grain, Irrigated South ID(2007)	Y	N	22	N	12	N	34
		P	32			P	32
İ	İ	K	124	麣		K	124

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	259

The acreage in the table is based on an average crop uptake of 100 lbs P₂O₅ per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Division of Animal Industries.

Hydraulic Balance

Field	Date
Field 12	April 1
Field 13	April 1
Field 14	April 1
Field 15	April 15

Field 16	April 1
Field 17	April 15

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test

Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Field 12 Crop: Corn-Field Grain, Irrigated South ID Yield: 160

## A	N	P205	K20
Crop Nutrient Requirement	255	58	43
Nutrients From Soil	?	9	
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	22		
from Irrigation Water	0		0
Nutrient Balance from above	268.9	57.5	43
Imported Nutrients	40	58	220
Estimated Remaining Nutrients Required	229	0	-178
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	229	0	-178

Acceptable: Sustainable agronomic rate.

Field: Field 13 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: Field 14 Crop: Corn-Field Grain, Irrigated South ID Yield: 160

	N	P205	K20
Crop Nutrient Requirement	255	58	43
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35	579	
from Prior Bio-Nutrients	22		
from Irrigation Water	0		0

Nutrient Balance from above	268.9	57.5	43
Imported Nutrients	40	58	220
Estimated Remaining Nutrients Required	229	0	-178
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	229	0	-178

Acceptable: Sustainable agronomic rate.

Field: Field 15 Crop: Alfalfa Hay, Irrigated South ID-Cut Mid Bloom Yield: 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: Field 16 Crop: Corn-Field Grain, Irrigated South ID Yield: 90

	N	P205	K20
Crop Nutrient Requirement	215	32	24
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	12		
from Irrigation Water	0		0
Nutrient Balance from above	238.6	32.3	24.2
Imported Nutrients	22	32	124
Estimated Remaining Nutrients Required	217	0	-100
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	217	0	-100
	THE RESERVE		

Rate is either deficit or is approaching an amount that may potentially contribute to an environmental risk.

Acceptable: Sustainable agronomic rate.

Field: Field 17 Crop: Corn-Field Grain, Irrigated South ID Yield: 90

	N	P205	K20
Crop Nutrient Requirement	215	32	24
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		

from Prior Bio-Nutrients	12		
from Irrigation Water	0		0
Nutrient Balance from above	50 e	32.3	24.2
Imported Nutrients	22	32	124
Estimated Remaining Nutrients Required	217	0	-100
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	21,7	0	-100

Caution: Rate is either deficit or is approaching an amount that may potentially contribute to an

environmental risk.

Acceptable: Sustainable agronomic rate.

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Field 12

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 57.5

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Rating: Medium

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

Rating: High

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 13

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Phosphorus Application Method: N/A

Rating: Very High

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Rating: Medium

Rating: High

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

Rating: Very High

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 14

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test

soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method

Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Medium

Manure Application Rate: 57.5

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except

for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific

Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P

levels.

Manure Phosphorus Application Method

Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 15

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All

necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Rating: Very Low or N.A.

Rating: Medium

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2";

otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P

levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 16

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application MethodRating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate

Rating: Low

Rating: High

Rating: Very High

Rating: Critical

Rating: Very Low or N.A.

Manure Application Rate: 32.3

Comments: Sufficient soil P is not available for normal agronomic production. Starter fertilizer is recommended for specific crops like potatoes (see Crop Specific Recommendations). Use recommended application rates and methods to build and maintain soil P at optimum

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Comments: No Data

Rating: Very Low or N.A.

Surface Irrigation or Overhead Irrigation

Comments: No Data

Rating: Very Low or N.A.

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body

Rating: High

Rating: High

Distance to Surface Water Body: 0.1

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 17

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject ≥ 2 "; otherwise incorporate ≥ 3 " by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Low

Manure Application Rate: 32.3

Comments: Sufficient soil P is not available for normal agronomic production. Starter fertilizer is recommended for specific crops like potatoes (see Crop Specific Recommendations). Use recommended application rates and methods to build and maintain soil P at optimum

Manure Phosphorus Application Method

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated)

Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation

Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices

Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body

Rating: High

Distance to Surface Water Body: 0.1

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Field 12

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation

Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Comments: No Data

Rating: Very Low or N.A.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 13

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Low

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 14

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity

(EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth

Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 15

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very High

Comments: Check and maintain system for leaky joints and worn-out pumps, sprinklers or nozzles. Use flow controllers to improve efficiency. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth

Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable

to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: Field 16

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency

Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth

Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: Field 17

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate

Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing

Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop

growth needs.

Irrigation Efficiency

Comments: No Data

Rating: Very Low or N.A.

Soil/Water Table Depth

Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

NUTRIENT RISK ANALYSIS Legend

	ВМР	Definition	Purpose
	Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
)	Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
	Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
	Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
1	Conservation Cover	This practice involves establishing and maintaining a protective cover of perennial vegetation on land	This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or

retired from agriculture production.

enhances wildlife habitat.

Conservation Cropping Sequence

Growing crops in a recurring sequence on the same field.

This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.

Contour Farming

Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)

To reduce erosion and control water.

Cover and Green Manure Crop

A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.

To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.

Critical Area Planting

Planting vegetation on critically eroding areas that require extraordinary treatment.

This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized

planting techniques and management.

An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.

Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.

A channel constructed across the slope with a supporting ridge on the lower side.

To divert excess water from one area for use or safe disposal in other areas.

Drip Irrigation

Dike or Berm

Diversion

A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.

To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.

Filter Strip

A strip or area of vegetation for removing pollutants water.

A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.

Fish Stream Improvement

Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.

The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.

Grade Stabilization Construction

A structure used to control the grade and head cutting in natural

These structures are to: Stabilize the grade and control erosion in

or artificial channels.

natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.

Grassed Waterway

A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.

Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.

Grazing Land Mechanical Treatment

Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.

This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.

Heavy Use Area Protection Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.

To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.

Irrigation Land Leveling

Reshaping the surface of land to be irrigated to planned grades.

To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.

Irrigation Water Management Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.

Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion;

Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.

Mulching

Applying plant residues or other suitable materials not produced on the site to the soil surface.

To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.

Polyacrylamide (PAM)

Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.

Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.

Prescribed Grazing

Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.

Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to:
1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.

Residue Management (Conservation Tillage)

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.

This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.

Riparian Forest Buffer

A riparian forest buffer is an area

The riparian forest buffer is a

of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement. multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.

Sediment Basin

A basin constructed to collect and store debris or sediment.

A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

Sprinkler System

A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.

To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.

Stream Channel Stabilization

Stabilizing the channel of a stream with suitable structures.

To control aggradations or degradation in a stream channel.

Stream bank Protection

Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion. To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander

that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.

Strip-cropping, Contour

Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or closegrowing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.

To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.

Strip-cropping, Field

Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.

To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.

Subsurface Drains

A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.

The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.

Surge Irrigation

Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.

Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the field and a more uniform application.

Tail water Recovery & Pumpback System

A facility to collect, store, and transport irrigation tail water for

To conserve farm irrigation water supplies and water quality by

reuse in a farm irrigation distribution system.

collecting the water that runs off the field surface for reuse on the farm.

Terraces

An earth embankment, a channel, or a combination ridge and channel constructed across the slope.

Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.

Use Exclusion

Excluding animals, people or vehicles from an area.

To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.

Water and Sediment Control Basin An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.

To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.

Watering Facility

A device (tank, trough, or other watertight container) for providing animal access to water.

To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.

Wetland Development/Restoration The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland. To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S.

Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculated the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0- to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct a S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes, and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops would have sufficient residual for alfalfa.

BORON

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do not use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the re-growth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition.

Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however. Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage.

Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

Corn-Field Grain, Irrigated South ID NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Adequate N is necessary for maximum economic production of irrigated field corn used for silage or grain. Fertilizer N represents by far the largest share of the fertilizer costs for field corn in Idaho. The amount of N required depends on many factors that influence total corn production and quality. These factors include length of growing season, corn hybrid, previous crop, past fertilizer use, soil type, leaching hazard and previous manuring. Estimates of both the N available to corn during the season and the yield potential of the crop should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical field corn yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a good field corn yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by triticale for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during

the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in pre-plant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of field corn. Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which field corn is grown occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to field corn. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N.

Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =

(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test)
(previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Coarse-textured soils, including sandy loams, loamy soils and sands, may lose N from leaching. For these soils, side dress a portion of the N at the time of the last cultivation. Sprinkler irrigation of corn under center pivots provides increased flexibility for providing N during the season. With sprinklers N can be injected into the system and applied with the water. On silt loam soils, split applications of N have not proven more effective as long as pre-plant N is adequately incorporated.

High N rates (approaching 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered. High plant populations (above 28,000 to 30,000) and early plantings of longer season hybrids in the Treasure Valley will respond to high N rates provided there are no other limiting factors. High N rates will not compensate for reductions in stand or delayed plantings. High plant populations of field corn are more susceptible to N shortages because of greater competition among plants for limited N.

Side dressing may cause root pruning depending on plant size, distance of shank from the row and placement depth. High N rates (above 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered. On sandy textured soils subject to leaching, side dress a portion of the N at the time of the last cultivation. Under sprinkler irrigations, N can be injected through the lines throughout the season. On silt loam soils, split applications of N have not proven more effective as long as pre-plant N is adequately incorporated.

PHOSPHORUS

Adequate phosphorus (P) is necessary for maximum production of field corn. The soil test for P is based on samples collected from the first foot of soil. The soil is extracted with sodium bicarbonate. Economic response to fertilizer P is more likely with cooler soil temperatures and soils with high lime content, particularly when planting long season hybrids. Phosphorus is an immobile nutrient that does not move appreciably from where it is placed. It should be mixed into the seedbed or banded within easy reach of the seedling roots before or during the planting operation.

POTASSIUM

Field corn requires adequate potassium (K) for optimum growth. Soil test K can be useful in determining the need for K fertilizers. The soil sample is taken from the first foot of soil and extracted with sodium bicarbonate. Fertilizer K rates are based on soil test.

MICRONUTRIENTS

Zinc (Zn) deficiencies occur primarily on soils that are eroded, leveled or where the exposed subsoil is higher in lime. The DTPA test on soil samples collected from the first foot can be used for identifying Zn fertilizer needs. Apply 10 pounds of Zn per acre when the soil test measures less than 0.6 ppm. Other micronutrients have not been shown to limit corn production. "Shotgun" applications of

micronutrient mixtures containing boron (B), copper (Cu), iron (Fe) and manganese (Mn) "for insurance" have not been shown to be economical and are not recommended.

SULFUR (S)

The major corn-growing regions in Idaho should not experience shortages of S. Areas with S deficiencies include some irrigated areas where both the soil and irrigation water are low in S. Snake River water is known to have high S concentrations. Coarse-textured soils including sandy loams, loamy sands and sands would be more susceptible to S deficiencies than silt loam soils. Where the need for S is evident, use 30 pounds per acre of sulfate-sulfur (S04).

SALINITY (SALTS)

Field corn has a low to moderate tolerance to accumulated salts. Soils with total salt readings above 3 or 4 mmhos/cm can be cropped effectively. Readings up to 6 are also satisfactory although more careful water management may be required.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.



- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:
 - 1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.
 - 2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.
 - 3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data Date of Test: No Data

Parameter	Units	0-12"	12-24"	18-24"
Soil Texture	-544	No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	0 -
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
Р	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	- 4 1-1
Fe	ppm	No Data	No Data	
Си	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	